WASTE-TO-ENERGY PLANT ENVIRONMENTAL ASSESSMENT

Final

Dyess Air Force Base, Texas

September 2011

Report Documentation Page

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14. ABSTRACT

Air Force bases have high energy demands, and must maintain a consistent, safe energy system, as well as comply with Department of Defense (DoD) renewable energy mandates. In recognizing these requirements, the Air Force plans to allow an energy provider to construct, own, and operate a WTE plant on leased Dyess AFB property. The purpose of the proposed action is to implement a renewable energy and security project at Dyess AFB, Texas. Under this proposal, Dyess AFB would authorize an energy contractor to construct and operate a WTE plant and associated municipal solid waste handling facility. Dyess AFB would agree to purchase up to 5.5 MW of power from the energy provider using one of four alternative technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/pyrolysis and 4) incineration. Under this program, Dyess AFB could pay less for energy than currently by being able to take advantage of real-time pricing, thereby avoiding price spikes during high-demand periods. Additionally, the WTE plant, as a renewable power project, would provide double credits to Dyess AFB towards meeting its energy reduction goals. Under the no-action alternative, the Air Force would not authorize construction or operation of the WTE plant. Dyess AFB would continue to rely on the regional electrical grid as its main source of power. This EA analyzed the potential environmental consequences of the proposed action and alternatives and no-action alternative for air quality, hazardous materials and hazardous waste, soils and stormwater, biological resources, socioeconomics, transportation, and utilities. Findings indicated that the proposed action would not significantly impact any resource area. All of the criteria pollutants analyzed in this EA are below the Prevention of Significant Deterioration (PSD) limit of 250 tons per year (tpy). Regardless of the final WTE plant design, compliance with the Texas Commission on Environmental Quality (TCEQ) permit conditions will be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. The proposed facility would be authorized under agreement such that Dyess AFB would lease the land for the WTE facilities but the energy provider would be responsible for the compliance of all permits for the facility. The proposed action would require approximately 5.6 acres of vegetation to be disturbed with potential impacts to wildlife; however, the impact would not be significant and no special-status species would be affected. Approximately 100 gallons per minute of effluent water would be discharged per day to the City of Abilene Publicly Owned Treatment Works. No significant cumulative impacts would occur from

15. SUBJECT TERMS

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FINDING OF NO SIGNIFICANT IMPACT
DYESS AIR FORCE BASE WASTE-TO-ENERGY PLANT

1.0 NAME OF THE PROPOSED ACTION

Dyess Air Force Base (AFB) Waste-to-Energy (WTE) Plant

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force (Air Force) proposes to implement a renewable energy and energy security project at Dyess AFB, Texas. Implementation of this project would ensure greater energy self-sufficiency and security, reduce long-term energy costs, and decrease Municipal Solid Waste (MSW) disposal and the need for landfill capacity for Dyess AFB.

Under this proposal, Dyess AFB would authorize the successful bidder of a solicitation to construct, own, and operate a WTE plant producing a minimum of up to 5.5-megawatts (MW) and associated MSW handling facility. The energy provider would be required by the solicitation to build a WTE plant based on one of the following alternative technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/ pyrolysis; or 4) incineration. The cities of Abilene and Tye, which could supply MSW to the WTE plant, could also benefit through reduced landfill requirements, transportation costs, and tipping fees. Operating a WTE plant on Dyess AFB would permit the base to reduce long-term energy and solid waste disposal costs through the process of burning of combustible MSW. Operating a WTE plant would also provide Dyess AFB with a reliable on-base source of electrical energy.

In addition, the Air Force analyzed the no-action alternative under which the Air Force would not authorize construction, operation, or installation of a renewable energy and energy security project at Dyess AFB. The Air Force would continue to rely on electricity from the regional electrical grid for the base's main source of power, resulting in continued exposure to higher priced energy, as well as noncompliance with Department of Defense (DoD) renewable energy mandates.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This EA provides an analysis of the potential environmental consequences resulting from implementation of the proposed action. Seven resource categories were thoroughly analyzed to identify potential impacts. According to the analysis in this EA, implementation of the proposed action using any of the alternative technologies would not result in significant impacts to any resource category. The following summarizes and highlights the results of the analysis by resource category.

Air Quality. No significant impacts to air quality would occur through implementation of any proposed action alternative. Regional transportation emissions would actually decrease, since Dyess AFB is 7 miles closer than the regional landfill located on the northeast side of Abilene; therefore, making the average round trip for MSW trucks 20 miles instead of 34 to the landfill. All of the criteria pollutants analyzed in this EA are below the Prevention of Significant Deterioration (PSD) limit of 250 tons per year (tpy). Regardless of the final WTE plant design and alternative technology, compliance with the Texas

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Commission on Environmental Quality (TCEQ) permit conditions will be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. Localized emissions would be below Texas and National Ambient Air Quality Standards (NAAQS) and not cause an adverse impact to local residents. Dyess AFB is in an area in attainment for all criteria pollutants and a formal conformity determination is not required. There would be no change to the current baseline emissions and permit requirements under implementation of the no-action alternative.

Hazardous Materials and Hazardous Waste. Some of the expected wastes (e.g., glass, metal) would be recyclable, while others would be collected, returned to the generator, and ultimately sent to a properly permitted disposal facility. Combustion ash, biochar, or slag from the combustion unit is not expected to meet the criteria for hazardous waste, but prior to any disposal the solid byproduct would be characterized using standard hazardous waste testing protocols. Depending on the results, the byproduct would be sent to the appropriate permitted disposal facility. Environmental Restoration Program (ERP) sites are not located near the proposed action and would not be affected. The implementation of the proposed action may classify the WTE as an industrial waste generator, but would not alter Dyess AFB's non-industrial waste generator status. No significant impacts to hazardous materials and hazardous wastes would occur with selection of any proposed action alternative. Under the no-action alternative, existing procedures for the management, procurement, handling, storage, and disposal of hazardous materials used on Dyess AFB would remain unchanged.

Soils and Storm Water. Impacts to soils and storm water resources would be negligible. Construction would disturb about 5.6 acres, but best management practices such as silt fencing and soil surface watering would minimize erosion and runoff. No adverse impact to soils and storm water resources would occur with implementation of the proposed action. A site-specific storm water permit and a Stormwater Pollution Prevention Plan would be obtained prior to construction. There would be no change to the current conditions of soil and water resources on Dyess AFB with implementation of the no-action alternative.

Biological Resources. While 5.6 acres of vegetation would be removed for the WTE establishment, impacts to these resources would not be significant. The area is mesquite woodlands and partially disturbed; no wetlands exist in the vicinity of the proposed action. A state special-status species, the Texas horned lizard, has been identified in the vicinity of the area and a preconstruction survey would relocate any lizard found in the proposed action location to suitable habitat elsewhere on base. Under the no-action alternative, no changes to existing conditions of vegetation, wildlife, wetlands, or special-status species would occur since no construction activities would be implemented.

Socioeconomics. Construction and operation activities would result in minor positive input into the regional economy. Approximately 25 to 30 workers would be employed at any one time during construction, and operation of the WTE plant would create seven new positions. Producing electricity on-site versus purchasing it through the regional electrical grid could result in long-term energy savings for Dyess AFB. Additionally, savings may be realized by the base and local communities because WTE

tipping fees would be lower than landfill costs. Under the no-action alternative, no changes to regional socioeconomics would be expected and they would remain unchanged from baseline conditions.

Transportation. Municipal solid waste trucks and WTE personal vehicles would add between 27 and 34 round trips per day to Farm-to-Market (FM) 3438 and Military Drive, resulting in no significant impacts to transportation resources, including road maintenance. Compared to the existing traffic, this contribution would be less than 0.35 to 0.60 percent of the current traffic volume along those routes. No impacts to transportation resources would be expected through implementation of the no-action alternative.

Utilities. For alternative 1, 2 and 3, the WTE plant would use 250 gallons per minute of effluent water from the City of Abilene Publicly Owned Treatment Works with supplemental water from Kirby Lake for the propane cooling towers. Evaporation losses of the cooling tower water would be approximately 150 gallons per minute and the resulting discharge would be approximately 100 gallons per minute of effluent returned back to the City of Abilene Publicly Owned Treatment Works for retreatment and discharge into Kirby Lake. Overall, the change in Kirby Lake levels would be a maximum of 1/100th of an inch per day and be imperceptible. The incineration process in Alternative 4 does not utilize a propane cooling tower, and thus, wastewater use and discharge would be less than under the other alternatives. No significant impacts utilities would occur through implementation of any proposed action alternative.

4.0 FINDINGS

On the basis of the findings of the EA, conducted in accordance with the requirement of the National Environmental Policy Act, the Council on Environmental Quality regulations, and 32 Code of Federal Regulations (CFR) Part 989, and after careful review of the potential impacts of the proposed action and no-action alternative, I find that there would be no significant impact on the quality of the human or natural environment from implementation of the proposed action or no-action alternative as described in the EA. Therefore, I find there is no requirement to develop an Environmental Impact Statement.

GARY D. CHESLEY, Colonel, USAF
Deputy Director, Installations and Mission Support

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ACRONYMS AND ABBREVIATIONS

ºF	Degrees Fahrenheit
µg	micrograms
7 BW	7th Bomb Wing
317 AG	317th Airlift Group
AEP	American Electric Power
AFB	Air Force Base
AGE	aerospace ground equipment
Air Force	United States Air Force
ATSDR	Agency for Toxic Substances and Disease Registry
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
dB	decibels
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
E.O.	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FM	Farm-to-Market
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gasses
gpm	gallons per minute
GWP	global warming potential
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutant
HBr	hydrogen bromide
HCl	hydrogen chloride
HF	hydrogen fluoride
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IMMP	Integrated Material Management Plan
IWMP	Integrated Waste Management Plan
MACT	Maximum Achievable Control Technology
MRL	Minimum Risk Level
MRR	Mandatory GHG Reporting Rule
MSA	Metropolitan Statistical Area
MSW	Municipal Solid Waste
MW	megawatt
N	nitrogen
N_20	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen Dioxide
NO_x	nitrogen oxides
O_3	ozone
OSHA	Occupational Safety and Health Act
Pb	lead
PBR	Permit by Rule
$PM_{2.5}$	particulate matter less than 2.5 Microns
PM_{10}	particulate matter less than 10 Microns
POTW	Publicly Owned Treatment Works
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SO_x	sulfur oxides
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
tpy	tons per year
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WTE	Waste-to-Energy

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Under this proposal, Dyess AFB would authorize the successful bidder of a solicitation to construct, own, and operate a WTE plant producing a minimum of up to 5.5-megawatts (MW) and associated MSW handling facility. The energy provider would be required by the solicitation to build a WTE plant based on one of the following alternative technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/ pyrolysis; or 4) incineration. The cities of Abilene and Tye, which could supply MSW to the WTE plant, could also benefit through reduced landfill requirements, transportation costs, and tipping fees. Operating a WTE plant on Dyess AFB would permit the base to reduce long-term energy and solid waste disposal costs through the process of burning of combustible MSW. Operating a WTE plant would also provide Dyess AFB with a reliable on-base source of electrical energy.

In addition, the Air Force analyzed the no-action alternative under which the Air Force would not authorize construction, operation, or installation of a renewable energy and energy security project at Dyess AFB. The Air Force would continue to rely on electricity from the regional electrical grid for the base's main source of power, resulting in continued exposure to higher priced energy, as well as noncompliance with Department of Defense (DoD) renewable energy mandates.

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Biological Resources. While 5.6 acres of vegetation would be removed for the WTE establishment, impacts to these resources would not be significant. The area is mesquite woodlands and partially disturbed; no wetlands exist in the vicinity of the proposed action. A state special-status species, the Texas horned lizard, has been identified in the vicinity of the area and a preconstruction survey would relocate any lizard found in the proposed action location to suitable habitat elsewhere on base. Under the no-action alternative, no changes to existing conditions of vegetation, wildlife, wetlands, or special-status species would occur since no construction activities would be implemented.

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4.0 FINDINGS

On the basis of the findings of the EA, conducted in accordance with the requirement of the National Environmental Policy Act, the Council on Environmental Quality regulations, and 32 Code of Federal Regulations (CFR) Part 989, and after careful review of the potential impacts of the proposed action and no-action alternative, I find that there would be no significant impact on the quality of the human or natural environment from implementation of the proposed action or no-action alternative as described in the EA. Therefore, I find there is no requirement to develop an Environmental Impact Statement.

GARY D. CHESLEY, Colonel, USAF
Deputy Director, Installations and Mission Support

7 SEP 2011

WASTE-TO-ENERGY PLANT
FINAL ENVIRONMENTAL ASSESSMENT (EA)

Responsible Agency: Dyess Air Force Base (AFB)

Proposed Action: The Air Force proposes to implement a renewable energy and energy security project at Dyess AFB, Texas. Under the proposed action, Dyess AFB would allow the successful bidder of a solicitation to construct, own, and operate a Waste-to-Energy (WTE) plant capable of producing a minimum of up to 5.5-megawatts (MW) of power and associated Municipal Solid Waste (MSW) handling facility.

Written comments and inquiries regarding this document should be directed to:

7 CES/CEAN (NEPA Program Manager)
710 3rd Street
Dyess AFB, TX 79607

Designation: Final Environmental Assessment

Abstract: Air Force bases have high energy demands, and must maintain a consistent, safe energy system, as well as comply with Department of Defense (DoD) renewable energy mandates. In recognizing these requirements, the Air Force plans to allow an energy provider to construct, own, and operate a WTE plant on leased Dyess AFB property. The purpose of the proposed action is to implement a renewable energy and security project at Dyess AFB, Texas. Under this proposal, Dyess AFB would authorize an energy contractor to construct and operate a WTE plant and associated municipal solid waste handling facility. Dyess AFB would agree to purchase up to 5.5 MW of power from the energy provider using one of four alternative technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/pyrolysis; and 4) incineration. Under this program, Dyess AFB could pay less for energy than currently by being able to take advantage of real-time pricing, thereby avoiding price spikes during high-demand periods. Additionally, the WTE plant, as a renewable power project, would provide double credits to Dyess AFB towards meeting its energy reduction goals. Under the no-action alternative, the Air Force would not authorize construction or operation of the WTE plant. Dyess AFB would continue to rely on the regional electrical grid as its main source of power. This EA analyzed the potential environmental consequences of the proposed action and alternatives and no-action alternative for air quality, hazardous materials and hazardous waste, soils and stormwater, biological resources, socioeconomics, transportation, and utilities. Findings indicated that the proposed action would not significantly impact any resource area. All of the criteria pollutants analyzed in this EA are below the Prevention of Significant Deterioration (PSD) limit of 250 tons per year (tpy). Regardless of the final WTE plant design, compliance with the Texas Commission on Environmental Quality (TCEQ) permit conditions will be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. The proposed facility would be authorized under agreement such that Dyess AFB would lease the land for the WTE facilities but the energy provider would be responsible for the compliance of all permits for the facility. The proposed action would require approximately 5.6 acres of vegetation to be disturbed with potential impacts to wildlife; however, the impact would not be significant and no special-status species would be affected. Approximately 100 gallons per minute of effluent water would be discharged per day to the City of Abilene Publicly Owned Treatment Works. No significant cumulative impacts would occur from implementing the renewable energy and energy security project at Dyess AFB, when combined with other past, present, or reasonably foreseeable actions.

Final

WASTE-TO-ENERGY PLANT ENVIRONMENTAL ASSESSMENT

Dyess Air Force Base, Texas

September 2011

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) analyzes the potential environmental consequences resulting from the United States Air Force (Air Force) proposal to implement a renewable energy and energy security project at Dyess Air Force Base (AFB), Texas. Under the proposed action, Dyess AFB would authorize the successful bidder to a solicitation to construct, own, and operate a Waste-to-Energy (WTE) plant and associated Municipal Solid Waste (MSW) handling facility.

This EA has been prepared by the Air Force, in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).

PURPOSE AND NEED FOR DYESS AFB WASTE-TO-ENERGY PLANT

In response to high energy demands, the need to maintain consistent, safe energy systems on Air Force bases, and Department of Defense (DoD) renewable energy mandates, the Air Force proposes to lease base property to an energy contractor for construction and operation of a WTE plant. Dyess AFB would agree to purchase up to 5.5 megawatts (MW) of power from the energy provider at rates competitive with real-time pricing while avoiding the price spikes experienced during high demand periods. The WTE plant as a renewable power project would provide double credits to Dyess AFB toward meeting its renewable energy goals.

In addition to renewable energy and energy security, this project would fulfill a need for additional conservation. For example, with landfills becoming a rare commodity, reducing landfill waste volumes would extend the operational life of local landfills.

PROPOSED ACTION AND NO-ACTION ALTERNATIVE

Under this proposal, Dyess AFB would permit an energy provider to construct, own, and operate a WTE plant producing a minimum of up to 5.5-MW and associated MSW handling facility using one of four technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/pyrolysis; or 4) incineration.

In addition to the proposed action and alternatives, the Air Force analyzed the no-action alternative. Under the no-action alternative, the Air Force would not authorize construction or operation of the WTE energy conservation project at the base. Dyess AFB would continue to rely on the regional electrical grid as its main source of power and resulting in continued exposure to higher priced energy, as well as noncompliance with DoD renewable energy and energy conservation mandates.

MITIGATION MEASURES

In accordance with 32 CFR Part 989.22, the Air Force must indicate if any mitigation measures would be needed to implement the proposed action under this environmental assessment. For purposes of this EA (to construct and operate a WTE plant and associated municipal solid waste handling facility), no mitigation measures would be needed to arrive at a finding of no significant impact if the proposed action were selected for implementation.

SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

According to the analysis in this EA, implementation of the proposed action would not result in significant impacts to any resource category. Implementing the proposed action would not significantly affect existing conditions at Dyess AFB or the surrounding environs. Table ES-1 summarizes the potential impacts for the proposed action and the no-action alternative.

Table ES-1. Summary of Potential Environmental Impacts

Resource	*WTE Plant Project*	*No-Action Alternative*
Air Quality	***Alternative 1:*** All of the criteria pollutants analyzed in this EA are below the PSD limit of 250 tons per year. Regardless of the final WTE plant design, compliance with the Texas Commission on Environmental Quality (TCEQ) permit conditions would be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. Local emissions would be at levels well below federal and Texas air quality standards. ***Alternatives 2-4:*** Although each alternative process would emit different amounts of pollutants, each alternative would also be below the PSD limit and each alternative would be required to comply with TCEQ regulations.	Baseline emissions would remain unchanged and Dyess AFB would continue to operate under 30 TAC 122.122.
Hazardous Materials and Hazardous Waste	***Alternative 1:*** Expected wastes of the WTE would be glass, metals, household hazardous waste, and the combustion ash, from the first stage of the gasification process. Some of these items are recyclable, while others would be returned to the generator, and ultimately, sent to a properly permitted accepting disposal facility. The first stage byproducts are not expected to be hazardous waste, but would be tested using standard hazardous waste testing protocols prior to disposal. Depending on the results, the byproducts would be sent to the appropriate disposal facility. Very small quantities of WTE maintenance waste (e.g., oily rags, adhesives) would be generated and would be handled in accordance with the Dyess AFB *Integrated Waste Management Plan.* ERP sites on the base would not be affected. ***Alternative 2:*** Biochar would be the waste generated from a pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 3:*** Glass slag would be the solid combustion by-product from a plasma gasification/pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 4:*** Similar to Alternative 1, combustion ash results from an incineration plant. Other wastes would also be similar to Alternative 1.	Existing procedures for the management, procurement, handling, storage, and disposal of hazardous materials used on Dyess AFB would remain unchanged. Hazardous materials and hazardous waste procedures would remain unchanged under baseline conditions.

Table ES-1. Summary of Potential Environmental Impacts		
Resource	***WTE Plant Project***	***No-Action Alternative***
Soils and Stormwater	***Alternative 1:*** Impacts to soils would be negligible, as would water resource impacts. Construction would disturb about 5.6 acres, but best management practices such as silt fencing and soil surface watering would minimize erosion and runoff. No adverse impact to soils and water resources would occur with implementation of the proposed action. A site specific storm water permit and a Stormwater Pollution Prevention Plan would be obtained prior to construction. ***Alternatives 2-4:*** Impacts to soils and stormwater would be identical under all alternatives.	There would be no change to the current conditions of soil and water resources on Dyess AFB with implementation of the no-action alternative.
Biological Resources	***Alternative 1:*** Approximately 5.6 acres of vegetation and habitat would be disturbed. The area is mesquite woodlands and partially disturbed to some degree. No wetlands exist in the vicinity of the proposed action; therefore, no impact to these resources would occur. A preconstruction survey would find and relocate any Texas horned lizards; therefore, no adverse impacts to special-status species would be expected. ***Alternatives 2-4:*** Impacts to biological resources under Alternatives 2 through 4 would be the same as Alternative 1.	No changes to existing conditions of vegetation or wildlife would occur since construction activities would not occur. No wetlands are found in the existing area, thus no impacts to wetland resources would occur. No changes to existing conditions of special-status species would occur.
Socioeconomics	***Alternative 1:*** Construction activities would result in minor, short-term positive input into to the local economy. Initially, operation of the WTE would result in the creation of seven new jobs, and could increase as operations continue. Producing electricity on-site versus purchasing it wholly through the regional energy provider would virtually eliminate line losses of energy and may provide energy cost savings. ***Alternatives 2-4:*** Socioeconomic impacts due to these alternatives would be the same as for Alternative 1.	Under the no-action alternative, no changes to regional socioeconomics would be expected as conditions would remain unchanged from existing conditions.
Transportation	***Alternative 1:*** MSW truck traffic would require about 30 round trips per weekday. Compared to the existing traffic, the contribution of the proposed action traffic would be less than 0.38 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 2:*** Under this alternative, MSW truck traffic would require about 36 round trips per weekday. The contribution of traffic under Alternative 2 would be less than 0.49 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 3:*** Under this alternative, MSW truck traffic would require about 25 round trips per weekday. The contribution of traffic under Alternative 3 would be less than 0.35 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 4:*** Under this alternative, MSW truck traffic would require about 44 round trips per weekday. The contribution of traffic under Alternative 4 would be less than 0.60 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive.	No impacts to transportation resources would occur through implementation of the no-action alternative.

Table ES-1. Summary of Potential Environmental Impacts		
Resource	***WTE Plant Project***	***No-Action Alternative***
Utilities	***Alternative 1:*** The WTE plant would require 250 gallons per minute of water to cool the optional closed-loop propane system and discharge approximately 100 gallons of recycled per minute to the City of Abilene Publicly Owned Treatment Works. Evaporation losses of the cooling tower water would be approximately 150 gallons per minute, but the change in Kirby Lake levels would be a maximum of 1/100th of an inch per day. The WTE operator would be required to obtain utilities independent from Dyess AFB and would also be required to obtain all the necessary permits required for WTE plant operations. No changes to Dyess AFB's current water or wastewater use would be required for the proposed action. ***Alternative 2-3:*** Under these alternatives, approximately the same amount of water and wastewater would be used as Alternative 1. ***Alternative 4:*** This alternative would use incineration to produce power and this technology would not lend itself well to using the optional closed-loop propane system and water use would be much less for this alternative.	No changes to current water use or wastewater services would occur.

EXECUTIVE SUMMARY

This Environmental Assessment (EA) analyzes the potential environmental consequences resulting from the United States Air Force (Air Force) proposal to implement a renewable energy and energy security project at Dyess Air Force Base (AFB), Texas. Under the proposed action, Dyess AFB would authorize the successful bidder to a solicitation to construct, own, and operate a Waste-to-Energy (WTE) plant and associated Municipal Solid Waste (MSW) handling facility.

This EA has been prepared by the Air Force, in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).

PURPOSE AND NEED FOR DYESS AFB WASTE-TO-ENERGY PLANT

In response to high energy demands, the need to maintain consistent, safe energy systems on Air Force bases, and Department of Defense (DoD) renewable energy mandates, the Air Force proposes to lease base property to an energy contractor for construction and operation of a WTE plant. Dyess AFB would agree to purchase up to 5.5 megawatts (MW) of power from the energy provider at rates competitive with real-time pricing while avoiding the price spikes experienced during high demand periods. The WTE plant as a renewable power project would provide double credits to Dyess AFB toward meeting its renewable energy goals.

In addition to renewable energy and energy security, this project would fulfill a need for additional conservation. For example, with landfills becoming a rare commodity, reducing landfill waste volumes would extend the operational life of local landfills.

PROPOSED ACTION AND NO-ACTION ALTERNATIVE

Under this proposal, Dyess AFB would permit an energy provider to construct, own, and operate a WTE plant producing a minimum of up to 5.5-MW and associated MSW handling facility using one of four technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/pyrolysis; or 4) incineration.

In addition to the proposed action and alternatives, the Air Force analyzed the no-action alternative. Under the no-action alternative, the Air Force would not authorize construction or operation of the WTE energy conservation project at the base. Dyess AFB would continue to rely on the regional electrical grid as its main source of power and resulting in continued exposure to higher priced energy, as well as noncompliance with DoD renewable energy and energy conservation mandates.

MITIGATION MEASURES

In accordance with 32 CFR Part 989.22, the Air Force must indicate if any mitigation measures would be needed to implement the proposed action under this environmental assessment. For purposes of this EA (to construct and operate a WTE plant and associated municipal solid waste handling facility), no mitigation measures would be needed to arrive at a finding of no significant impact if the proposed action were selected for implementation.

SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

According to the analysis in this EA, implementation of the proposed action would not result in significant impacts to any resource category. Implementing the proposed action would not significantly affect existing conditions at Dyess AFB or the surrounding environs. Table ES-1 summarizes the potential impacts for the proposed action and the no-action alternative.

Table ES-1. Summary of Potential Environmental Impacts

Resource	*WTE Plant Project*	*No-Action Alternative*
Air Quality	***Alternative 1:*** All of the criteria pollutants analyzed in this EA are below the PSD limit of 250 tons per year. Regardless of the final WTE plant design, compliance with the Texas Commission on Environmental Quality (TCEQ) permit conditions would be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. Local emissions would be at levels well below federal and Texas air quality standards. ***Alternatives 2-4:*** Although each alternative process would emit different amounts of pollutants, each alternative would also be below the PSD limit and each alternative would be required to comply with TCEQ regulations.	Baseline emissions would remain unchanged and Dyess AFB would continue to operate under 30 TAC 122.122.
Hazardous Materials and Hazardous Waste	***Alternative 1:*** Expected wastes of the WTE would be glass, metals, household hazardous waste, and the combustion ash, from the first stage of the gasification process. Some of these items are recyclable, while others would be returned to the generator, and ultimately, sent to a properly permitted accepting disposal facility. The first stage byproducts are not expected to be hazardous waste, but would be tested using standard hazardous waste testing protocols prior to disposal. Depending on the results, the byproducts would be sent to the appropriate disposal facility. Very small quantities of WTE maintenance waste (e.g., oily rags, adhesives) would be generated and would be handled in accordance with the Dyess AFB *Integrated Waste Management Plan.* ERP sites on the base would not be affected. ***Alternative 2:*** Biochar would be the waste generated from a pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 3:*** Glass slag would be the solid combustion by-product from a plasma gasification/pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 4:*** Similar to Alternative 1, combustion ash results from an incineration plant. Other wastes would also be similar to Alternative 1.	Existing procedures for the management, procurement, handling, storage, and disposal of hazardous materials used on Dyess AFB would remain unchanged. Hazardous materials and hazardous waste procedures would remain unchanged under baseline conditions.

Table ES-1. Summary of Potential Environmental Impacts		
Resource	***WTE Plant Project***	***No-Action Alternative***
Soils and Stormwater	***Alternative 1:*** Impacts to soils would be negligible, as would water resource impacts. Construction would disturb about 5.6 acres, but best management practices such as silt fencing and soil surface watering would minimize erosion and runoff. No adverse impact to soils and water resources would occur with implementation of the proposed action. A site specific storm water permit and a Stormwater Pollution Prevention Plan would be obtained prior to construction. ***Alternatives 2-4:*** Impacts to soils and stormwater would be identical under all alternatives.	There would be no change to the current conditions of soil and water resources on Dyess AFB with implementation of the no-action alternative.
Biological Resources	***Alternative 1:*** Approximately 5.6 acres of vegetation and habitat would be disturbed. The area is mesquite woodlands and partially disturbed to some degree. No wetlands exist in the vicinity of the proposed action; therefore, no impact to these resources would occur. A preconstruction survey would find and relocate any Texas horned lizards; therefore, no adverse impacts to special-status species would be expected. ***Alternatives 2-4:*** Impacts to biological resources under Alternatives 2 through 4 would be the same as Alternative 1.	No changes to existing conditions of vegetation or wildlife would occur since construction activities would not occur. No wetlands are found in the existing area, thus no impacts to wetland resources would occur. No changes to existing conditions of special-status species would occur.
Socioeconomics	***Alternative 1:*** Construction activities would result in minor, short-term positive input into to the local economy. Initially, operation of the WTE would result in the creation of seven new jobs, and could increase as operations continue. Producing electricity on-site versus purchasing it wholly through the regional energy provider would virtually eliminate line losses of energy and may provide energy cost savings. ***Alternatives 2-4:*** Socioeconomic impacts due to these alternatives would be the same as for Alternative 1.	Under the no-action alternative, no changes to regional socioeconomics would be expected as conditions would remain unchanged from existing conditions.
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Table ES-1. Summary of Potential Environmental Impacts		
Resource	***WTE Plant Project***	***No-Action Alternative***
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PURPOSE AND NEED FOR THE PROPOSED ACTION

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CHAPTER 1
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (U.S.) Air Force (Air Force) proposes to solicit bids for a private entity to construct, own, and operate a Waste-to-Energy (WTE) plant and associated Municipal Solid Waste (MSW) handling facility on land leased from the Air Force at Dyess Air Force Base (AFB). Dyess AFB would then agree to purchase up to 5.5 megawatts (MW) of power from the WTE plant. Four alternative technologies are being considered for the proposed WTE plant. This WTE plant would significantly contribute to fulfilling renewable energy and security goals as directed by the Department of Defense (DoD).

Implementation of this project would ensure greater energy self-sufficiency and security, reduce energy costs, and decrease MSW disposal and the need for landfill capacity for Dyess AFB. It is anticipated that the cities of Abilene and Tye would supply MSW to the WTE plant, and would also benefit through reduced landfill requirements. Operating a WTE plant on Dyess AFB would permit the base to reduce energy and solid waste disposal costs through a small municipal waste combustion unit. Operating a WTE plant would also provide Dyess AFB with a reliable 24-hour-a-day on-base source of electrical energy. Under this program, Dyess AFB would pay less for energy by purchasing power at rates competitive with real-time pricing, while avoiding the price spikes experienced during high-demand periods. The WTE plant, as a renewable energy project, would provide double credits to Dyess AFB for meeting its DoD-directed energy reduction goals.

In addition to the proposed action and alternatives, the Air Force analyzed the no-action alternative. Under the no-action alternative, the Air Force would not seek a private entity to construct, own, and operate a WTE plant at Dyess AFB. The Air Force would not receive the benefits of reduced electricity and reduced solid waste disposal costs, nor would the base achieve its energy security and renewable energy goals.

This Environmental Assessment (EA) has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Part 1500-1508, and Air Force compliance with NEPA as promulgated in 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).

1.2 BACKGROUND

Dyess AFB is located near the southwest edge of Abilene in Taylor County, Texas, about 180 miles west of Dallas (Figure 1-1). Interstate 20 and U.S. Highway 83/84 run just north of the base, and to the east and south is U.S. 277. Dyess AFB occupies 6,432 acres and includes the airfield (runway and flightline), aircraft maintenance and industrial areas adjacent to the airfield, administrative buildings and housing accommodations, recreational areas, and open space.

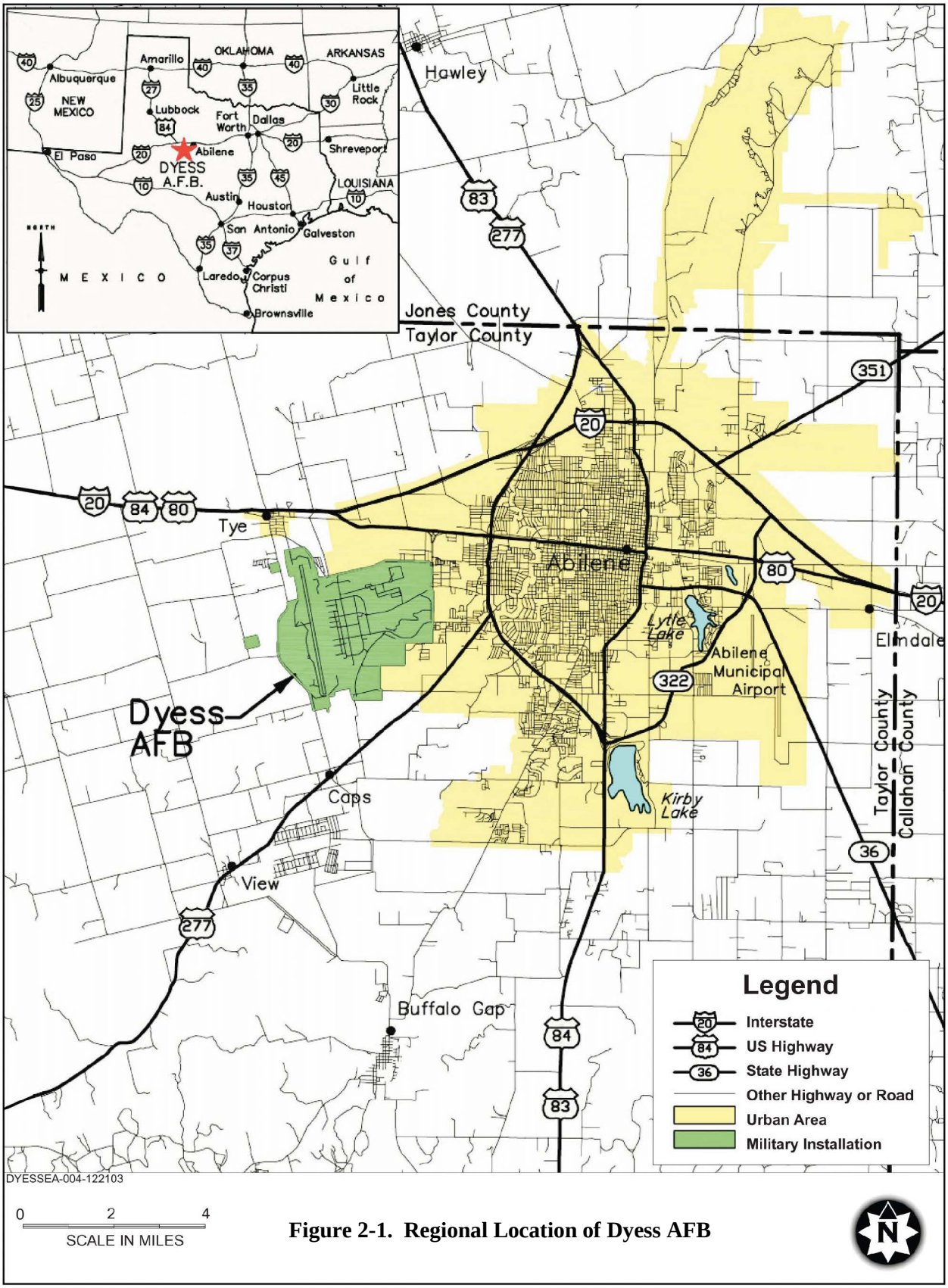

Figure 2-1. Regional Location of Dyess AFB

The eastern portion of the base is primarily bordered by residential development, while the southern and western sections are adjacent to agricultural land. Mixed agricultural and residential land uses characterize the area bordering the northern portion of the base.

Dyess AFB hosts the Air Combat Command's 7th Bomb Wing (7 BW), which operates the B-1B Lancer long-range bomber. The 7 BW serves important Air Force training and combat roles. Air Mobility Command's 317th Airlift Group (317 AG) is a major tenant organization at Dyess AFB, which operates C-130H Hercules transport aircraft to support airlift requirements worldwide.

1.3 PURPOSE AND NEED FOR DYESS AFB WASTE-TO-ENERGY PLANT

1.3.1 Purpose of the Proposed Action

Air Force bases have high energy demands, and must maintain a consistent, safe energy system, as well as comply with DoD renewable energy mandates. In recognizing these requirements, the Air Force proposes to allow an energy provider to construct, own, and operate a WTE plant on leased Dyess AFB property. The purpose of the proposed action is to implement a renewable energy and security project at Dyess AFB, Texas. Under this proposal, Dyess AFB would authorize an energy contractor to construct, own, and operate a WTE plant and associated municipal solid waste handling facility. Dyess AFB would agree to purchase up to 5.5 MW of power from the energy provider. Under this program, Dyess AFB would pay less for energy by purchasing power at rates competitive with real-time pricing, while avoiding price spikes during high-demand periods as described below. Additionally, the WTE plant, as a renewable power project, would provide double credits to Dyess AFB towards meeting its renewable energy goals.

Operating a WTE plant would provide a supplemental power source for the base, thus reducing the amount needed from outside electrical sources. Currently, Dyess AFB purchases16 MW of electricity per hour on an average work day (the proposal of up to 5.5 MWs from the WTE represent only a portion of one hour's power requirements). This equates to approximately 78,000 MW hours of energy purchased annually from the off-base commercial electrical grid. This quantity represents 100 percent of the total annual usage for Dyess AFB, making the base's energy vulnerable to security risks and price increases.

The WTE plant would include a waste handling and recycling facility. MSW consisting of household waste from Dyess AFB, the City of Abilene, and the City of Tye, could be used to generate electricity through a process of separation, gasification, and combustion to power boilers, and in turn, to power turbines. The energy contractor operating the WTE plant could also use biomass or MSW from other locations. It is presumed plant operator would use local wastes, but it would not be a requirement.

In addition to renewable energy measures and energy security, the WTE plant would fulfill a need for additional conservation. With landfill space becoming a rare commodity, reducing landfill waste volumes would extend the operational life of local landfills. Construction and operation of the WTE plant would provide additional jobs for the local economy.

1.3.2 Need for the Proposed Action

Four factors dictate the need for the proposed action:

- renewable energy mandates,
- on-base power generation for energy security,
- reduction in power costs, and
- reduction in MSW disposal costs.

Renewable Energy Mandates

According to DoD Instruction 4170.10, energy is critical to executing the DoD peacetime, surge, mobilization, and wartime missions. The instruction requires all the DoD organizations to plan and program resources for the acquisition and maintenance of adequate and secure energy supplies, and attendant energy distribution systems in the most efficient, life-cycle cost-effective manner possible.

The DoD policy is to minimize the amount of energy used and its cost, while meeting operational mission support requirements and providing quality working and living conditions for DoD personnel and military dependents. Actions to accomplish that support the policy shall consist of:

- Ensuring that all cost-effective actions are taken to eliminate energy waste, improve energy utilization efficiency, and implement measures to reduce energy cost;
- Using the most life-cycle cost-effective fuels in new energy producing facilities,
- Acquiring energy from facilities constructed with private capital;
- Applying energy conservation techniques, using shared energy savings contracts when they are the most cost-effective option to achieve the savings; and
- Using cost-effective and reliable renewable energy sources and systems.

Additionally the National Defense Authorization Act for 2007 (10 U.S.C. 2911 (e)(1)) requires the Secretary of Defense to develop a comprehensive plan to help achieve the energy performance goals for DoD. Among other energy performance goals is the requirement that not less than 25 percent of all DoD electricity consumed be produced or procured from renewable energy sources by 2025.

The Dyess AFB WTE plant would meet all of the above DoD requirements and goals with long-term energy savings and security, increased recycling, and reduced MSW disposal and the need for landfill capacity.

On-Base Power Generation for Energy Security

As a national security asset, Dyess AFB needs a secure, uninterrupted, and reliable supply of electrical energy. Having a WTE plant on Dyess AFB property would ensure the Air Force high security procedures could protect the production of energy and maintain a consistent, safe energy system. Operating a WTE plant on base would provide a supplemental power source, thus reducing the requirement for 100 percent outside electrical power service, which currently makes the base's energy supply vulnerable to security risks.

Reduction in Power Costs

Energy costs can be extremely high. In today's Air Force, cost reductions are being exercised from the ground up. Every installation must reduce costs while maintaining mission readiness. Consistent power is necessary, as power outages at Dyess AFB can be frequent and costly. Utilities charge the base a higher rate during periods of peak power demand.

In 2010, Dyess AFB paid $3.8 million for electricity under a real-time pricing arrangement. This pricing plan provides overall lower electricity costs from fixed price contracts. However, rates during periods of peak power demand can be extremely high. Additionally, transmission and distribution charges are based on absolute peak draw and Dyess AFB consistently pays for over 18 MW of electricity, even though actual consolidated demand remains less than 14 MW. By establishing its own power source (i.e., the WTE plant), Dyess AFB would avoid such costly and unnecessary expenditures for energy during high-demand periods by reducing its overall base load. Additionally, the WTE plant would establish a stabilized rate for a third of the base's energy needs that is competitive with real-time rates for the next 15-20 years, assuring Dyess AFB of more consistent and manageable costs.

Reduction in MSW Disposal Costs

Currently, Dyess AFB spends approximately $450,000 annually to send about 2,696 tons of MSW for disposal at a municipal landfill, with another $170,000 spent to collect and market recyclable materials. In addition to the significant operating costs of MSW transportation to the landfill and tipping fees, landfill space is also at a premium. By constructing the proposed WTE plant, the disposal and related costs of MSW could be reduced for Dyess AFB. Also, if the WTE used MSW generated in Abilene and Tye, it could also decrease disposal costs for these cities and increase recycling revenues for Dyess AFB.

DoD Instruction 4170.10 and the National Defense Authorization Act for 2007 (10 U.S.C. 2911 (e)(1)) require that the Services reduce their electrical demands and increase their use of renewable energy sources. Not implementing the WTE plant project at Dyess AFB would delay the implementation of these DoD directives, would negatively affect the overall Dyess AFB energy program, and would prevent the base from achieving renewable energy goals and enhanced energy security. For these reasons, Dyess AFB needs to solicit bids for the construction, ownership, and operation of up to 5.5 MW WTE plant.

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CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

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CHAPTER 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Air Force proposal to implement a renewable energy project on Dyess AFB. Under this proposal, Dyess AFB would have a WTE plant built, owned and operated by an energy provider on Dyess AFB property. The base would agree to purchase up to 5.5 MW of power from the WTE plant. As dictated by the solicitation to build the WTE plant, the energy provider would be required to employ one of the following technologies: 1) gasification; 2) pyrolysis; 3) plasma gasification/pyrolysis; or 4) incineration. These technologies represent alternatives evaluated in this EA; implementation of any one of the alternatives would fulfill the proposed action. In compliance with NEPA and CEQ regulations (40 CFR §§1500-1508), this EA also evaluated the no-action alternative. For the no-action alternative, no WTE plant would be constructed. As a result, Dyess AFB would not achieve renewable energy goals mandated by DoD.

2.1 ALTERNATIVE IDENTIFICATION PROCESS

Alternatives form the core of the NEPA process. In compliance with NEPA, 32 CFR 989, which implements the Air Force's NEPA process, and CEQ regulations, the Air Force must consider reasonable alternatives to the proposed action. Only those alternatives determined as reasonable relative to their ability to fulfill the need for a proposed action warrant detailed analysis. To be considered reasonable, an alternative must not only fulfill the purpose and need for the action, it must be technically and fiscally feasible. It must also involve an action that is reasonably foreseeable. Through rigorous evaluation, an agency needs to examine a range of alternatives, determining those deemed reasonable and those not carried forward for detailed analysis.

2.1.1 Action Alternatives Carried Forward for Detailed Analysis

In the process of considering potential alternatives to implement the proposed action, Dyess AFB examined proven technologies for producing energy from a WTE plant necessary to fulfill the purpose and need. All alternatives would use MSW (as referenced in this EA, MSW may include agricultural crop, wood, and animal waste as well as municipal waste) as input for the process and include:

- gasification
- pyrolysis
- plasma gasification/pyrolysis
- incineration

The method of producing electricity must be one of the four alternative processes listed above. These are described in greater detail in Section 2.2. Any of these alternatives would be co-located with existing back-up generators on Dyess AFB property on Military Drive. The back-up generators provides electricity during power outages and electrical transmission lines already exist on the site. Co-locating the WTE plant near the generator site would isolate the industrial nature of power generation operations to the perimeter of base yet allow them to remain on base property.

2.1.2 Alternatives Not Carried Forward for Further Detailed Analysis

In the process of considering potential alternatives to the proposed action, Dyess AFB examined other means of implementing renewable energy initiatives necessary to fulfilling the purpose and need. These options included:

- relocating the WTE project elsewhere on or off Dyess AFB;
- using only Dyess AFB MSW; and
- developing other renewable energy sources.

As demonstrated below, none of these options yielded reasonable alternatives. Each option either failed in some manner to meet the purpose and need or proved infeasible. As a result, this EA evaluated the four technical processes outlined in Section 2.1.1 above and the no-action alternative.

Relocating the Project

Several limitations preclude relocating the project to sites different than those defined in the proposed action. Locating the facility off base would not meet the energy security requirements, making this option infeasible.

Under the proposed action, Dyess AFB would co-locate the WTE plant with the existing back-up generators for operational and infrastructure efficiency. The back-up generators provide the primary source for emergency power and are permitted for up to 300 hours per year. Furthermore, the back-up generators are already connected by transmission lines to Substation B near the Tye Gate which serves the base. The WTE would primarily supplement the base's energy requirements purchased from off-site sources, but would also supplement the back-up generators during power outages and work in tandem as necessary. Splitting the two projects into separate locations would not only limit the coordination between the WTE plant and the generators during power outages, it would require increased costs for transmission. These factors preclude using a different site on Dyess AFB for an alternative.

Using Only Dyess AFB MSW

Using MSW from only Dyess AFB to supply the WTE plant would not provide a sufficient fuel source for the facility. To maintain nominal electrical output at up to 5.5 MW, the WTE requires input of 50,000 tons of MSW per year. Dyess AFB can supply only 1,000 to 8,000 tons per year. The cities of Abilene and Tye could consistently provide the balance of MSW required through a memorandum of understanding. Without the balance from the cities, an electrical shortfall would result. To meet the electrical shortfall, Dyess AFB would need to either continue drawing energy from off-base sources, or install additional and larger diesel- or biodiesel-powered generators. Using off-base electrical energy would preclude energy independence for Dyess AFB and not meet the purpose and need of energy conservation. Additionally, current cost issues would persist. Therefore, an alternative based on use of only Dyess AFB MSW would not meet the test for reasonableness.

Other Renewable Energy Sources

Wind energy and solar energy are other renewable energy sources that could potentially achieve some of the purpose and need for this action. Both require considerable more real estate to produce an equivalent amount of energy. Windmill generators pose unique problems around an Air Force base. First, modern windmills capable of generating a comparable amount of electricity approach 500 feet in height. Around an airfield, towers of this height would pose an unacceptable flight safety risk, particularly if several towers were used. Secondly, the turning blades on a windmill produce electromagnetic interference which can confuse a radar picture or obscure its view of aircraft. Furthermore, the power is provided via a commercial electrical company and Dyess AFB has no control over the power costs. Dyess AFB is an area of only moderate solar resources. Solar energy panels need direct sunlight to generate power, requiring thirty times the land area to produce the same total amount of power as a WTE plant. Individual solar panels used for commercial applications are approximately 174 watt panels, each measuring 3 feet by 5 feet and grouped together to achieve the desired output wattage. In this case, approximately 96,000 panels would be necessary to produce the equivalent total power as the WTE plant. For these reasons, wind and solar power were eliminated from further consideration.

2.2 PROPOSED ACTION AND ALTERNATIVES

The proposed action would build and operate a WTE plant on Dyess AFB using one of four technology alternatives. The WTE plant operator would be responsible for meeting all operating requirements including water and waste-water, electricity, and MSW for the plant from public sources, as well as producing a supplemental EA for impacts of acquiring these infrastructure resources. The exact design of the WTE is unknown at this time; however, the EA is being prepared to set the environmental impact boundaries and limits which the WTE plant operator must remain within when choosing the method of energy production. Dyess AFB would agree to purchase up to 5.5 MW of power from the WTE plant. The plant would be segregated from the base proper and be sited next to the emergency back-up generator system on Military Drive (Figure 2-1). Specifics of the WTE plant and handling of the MSW would vary slightly depending on the energy production process selected, as noted below, and will be presented in general in this EA. The U.S. Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ) requirements for Title V permitting would apply to all emission sources for the facility. In addition, the WTE would be built and operated to comply with 40 CFR Part 60 Subpart AAAA, *New Source Performance Standards for new Small Municipal Waste Combustion Units.*

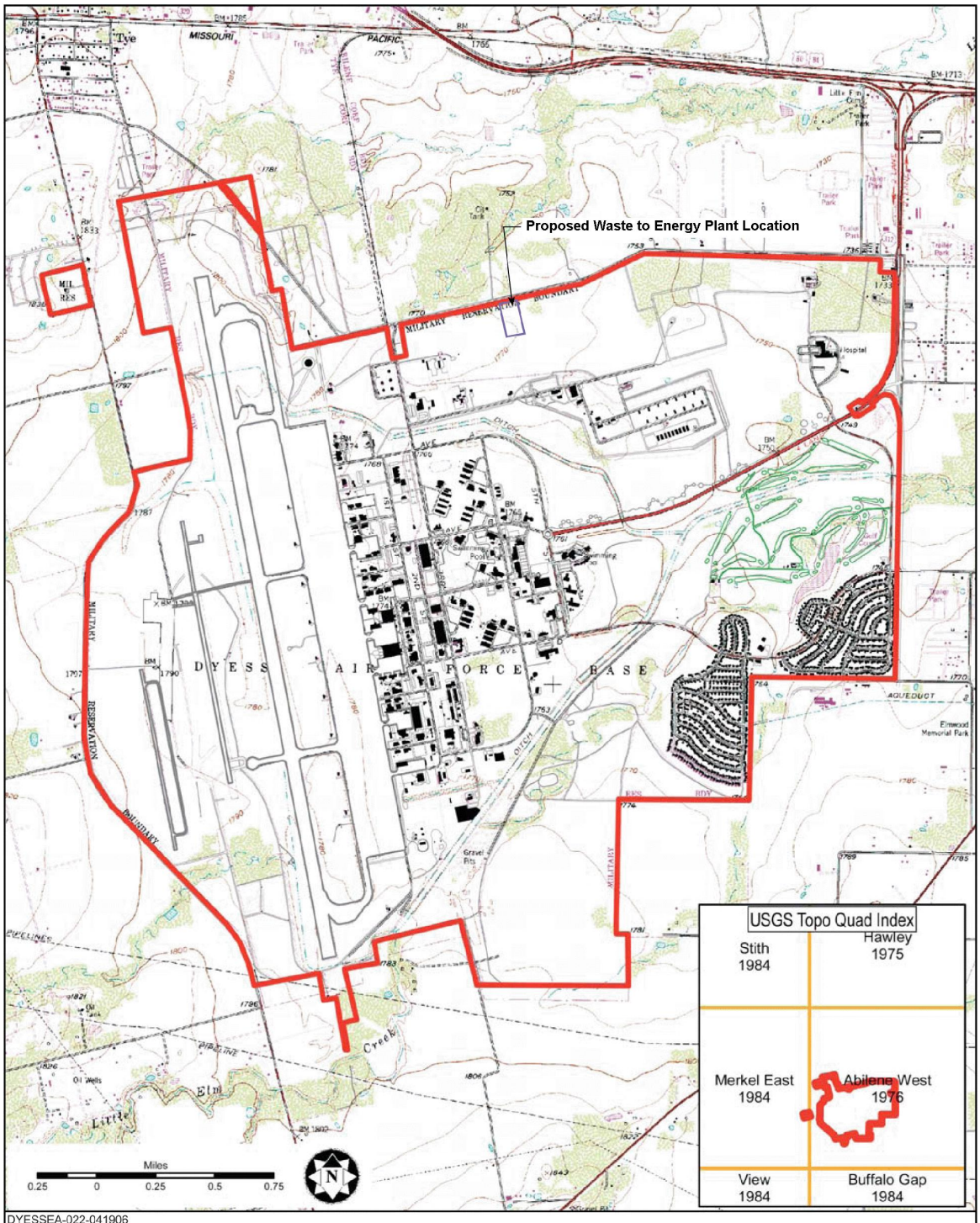

Figure 2-1. Proposed Project Location, Dyess AFB

Gasification, pyrolysis, plasma gasification/pyrolysis, and incineration all produce energy by combusting MSW but each has unique properties. Plasma gasification/pyrolysis would be the most efficient using the least amount of MSW, ranging to incineration which would use the most MSW to produce an equivalent amount of energy. With all technologies except incineration, the combustor produces a synthetic gas that can be used to generate power. The synthetic gas is further combusted to run a gas turbine and then the residual heat can run a steam turbine. Generally, the flue gas from an incineration plant is not combustible and only a steam turbine would be operated from the heat transfer using the flue gas. All combustors create solid by-products including slag and/or ash which can be used in asphalt or other usable materials; however this EA assumes all of the solid by-products are disposed as waste. Other differences include parasitic load, temperature, and the degree of oxygenation of the process. Table 2-1 depicts the properties and differences of each alternative.

Table 2-1. Alternatives Comparison

	Alternative 1 Gasification	***Alternative 2 Pyrolysis (slow and fast)***	***Alternative 3 Plasma Gasification/ Pyrolysis***	***Alternative 4 Incineration***
MSW tons per day (tpd) to produce up to 5.5 MW[1]	125	167	100	200
Power Generation	gas and steam turbine	gas and steam turbine	gas and steam turbine	steam turbine
Solid Byproduct	ash/slag	biochar/bio-oil	glass slag	ash
Gas Byproduct	syngas	syngas	syngas	flue gas
Plant Parasitic Load (%)[2]	5	5	46	13-14
Temperature	800 to 1,000 °F	480 to 1,470 °F	2,190 ºF	1,562°F
Oxygenated Process	low	no	low	Yes

Note:
[1]Gasification input is based upon engineering that Siemens Building Technologies in the previous proposal for a WTE at Dyess.
[2]Plant parasitic load = (Gross power – Net power)

After completion of the environmental impact analysis process, the Air Force proposes to issue a request for proposal to bid on construction and operation of a WTE plant on Dyess AFB. The winning bidder would be required to design and engineer the WTE facility utilizing one of the four alternative methods analyzed in this EA. Any design that falls outside the parameters analyzed would require additional environmental analysis.

Pyrolysis and gasification, like incineration, are options for recovering value from waste by thermal treatment. All convert feedstocks/wastes into energy by heating the waste under controlled conditions. Whereas incineration converts the input waste into a combusted flue-gas that can then be used to recover thermal energy (usually in the form of steam) and ash, pyrolysis and gasification deliberately limit the conversion so that combustion does not take place directly. Instead, they convert the waste into potentially valuable intermediates that can be further processed for materials recycling or energy recovery. Pyrolysis and gasification offer more capacity for recovering products from waste than incineration. Additionally, both gasification and pyrolysis processes can add the use of plasma arcs or torches, increasing the temperatures and allowing further breakdown of components. As shown in Table 2-1, plasma gasification/pyrolysis is estimated to use less MSW than the other options with

gasification, pyrolysis and incineration following in that order due to the efficiencies of the particular technology. All WTE processes have advantages and disadvantages as discussed below.

2.2.1 Alternative 1 – Gasification

The production of electricity involves a complicated set of equipment. The gasification process uses MSW and air as inputs into the system; outputs are electricity, recyclable materials from the sorting process, solids in the form of combustion ash, process wastewater from the condensing process, and exhaust gases.

The main objective of gasification is to produce energy in the form of syngas. Because the gasification is optimized for total energy output the biomass is typically reduced to ash instead of biochar as additional oxygen to the burn cycle allows for more complete combustion. Gasification consists of converting high-carbon materials into a steady flow of energy-rich and combustible hydrogen and carbon monoxide syngases in a high temperature reaction within an oxygen controlled environment that typically generates less biochar production than pyrolysis.

The gasification process converts municipal solid waste into energy in a staged combustion process. After sorting, the feedstock (waste) is burned in an oxygen deficient atmosphere around 800 to 1,000 °F. This first stage allows for the chemical breakdown of the feedstock, releasing synthetic gas (hydrogen, carbon and volatile organic compounds) from the material. The synthetic gas is then processed in the second stage. The residue is frit, a glassy, solid material or combustion ash. As discussed in the incineration process above, the residue is tested for hazardous waste, which, if present, is sent to an appropriate landfill for proper disposal.

Additional air is added to the synthetic gas to increase the temperature to approximately 1,400 °F, but it is still a relatively deficient air environment which does not allow for the production of nitrogen and sulfur oxides (NO_x and SO_x). Finally, the gas and air mixture is brought to complete combustion in the third stage.

The high temperature synthetic gas (approximately 2,000°F) at the end of the third stage is typically used directly in a gas turbine for energy production. The gas is passed through a heat recovery steam generator and the resultant steam runs the steam turbine. Using steam and a steam turbine rather than synthetic gas directly into a gas turbine reduces corrosion, and wear and tear on the turbine. The synthetic gas, after passing through the heat exchanger, goes through a heat recovery system which condenses the flue gas. This condensing process causes the HCl, hydrogen fluoride (HF), and hydrogen bromide (HBr) to go into an aqueous solution. The condenser uses a closed loop propane heat recovery system. Recycled water would be used to cool the propane heat recovery system. The heat recovered would be used to power a steam generator. In all, the gasification turbines could produce approximately 4.4 MW of electricity, with an additional 2.4 MW generated from the heat recovery turbine.

2.2.2 Alternative 2 – Pyrolysis

In the simplest terms, pyrolysis can be defined as "gasification minus oxygen." Pyrolysis is the technique of heating organic matter (biomass) between 480 and 1,470 °F in the absence of oxygen. The biomass is essentially "cooked" in a kiln until various products break down to produce a hydrogen- rich fuel stream that can either be combusted or condensed for energy generation. As the material passes through the kiln, a combustible synthetic gas (syngas) is produced and continuously removed from the kiln. The high-carbon product that remains is biochar from which most of the hydrogen has been removed. A common example of a pyrolysis process is charcoal briquettes.

Several sub-types of pyrolysis exist, with a slow process or a fast process being the most commercially available and popular. Slow pyrolysis requires low-to-medium temperatures between 480 and 1,290 °F at relatively long residence times typically taking hours or days (depending on kiln size) and generates three yields: between 35 and 50 percent biochar from the original weight of the biomass, water, and a syngas. The properties of the resulting biochar and syngas are heavily determined by feedstock material, temperature, and residence times.

While biochar production is generally maximized with slow pyrolysis, fast pyrolysis offers the benefit of bio-oil production in addition to biochar. Fast pyrolysis, sometimes called "flash carbonization," occurs in a matter of 0.5 to 2 seconds with modest temperature requirements of approximately 750 to 1100 °F. The process yields approximately 60 to 70 percent biofuels, 10 to 20 percent biochar, and 10 to 25 percent producer gases.

Fast pyrolysis takes advantage of a swift biomass-to-biochar reaction which has been used primarily to convert biomass into bio-oils and secondarily to produce biochar. But fast pyrolysis typically also comes with a cost. Before feedstock material is fed into the reaction chamber, it must be quite small (less than 3 millimeters) and dry (less than 10 percent moisture content) which typically means there is some energy penalty to be paid in terms of preprocessing as well as active drying of the biomass.

Pure pyrolysis is rarely used by itself and would require considerable modification of the MSW waste handling process if used alone. It is frequently followed by a downstream combustion or plasma gasification stage that converts pyrolysis tars into end-products that are more re-usable, such as syngas, and allows a broader spectrum of MSW input.

2.2.3 Alternative 3 – Plasma Gasification/Pyrolysis

Gasification and pyrolysis are separate processes as stated above; however, the addition of intense plasma heat into either process makes the differences between them basically nonexistent. Therefore, plasma gasification and plasma pyrolysis are often used interchangeably because both produce an energy-rich product gas. Some plasma processes convert the tars to carbon monoxide and hydrogen in a secondary cracking reactor (the main reason for this second stage is tighter control over the syngas/flue gas production), while in other configurations, the plasma gasification (or partial combustion for some) reactions take place in the very same reactor, thus further blurring the boundaries between the two reactions.

Plasma (a collection of charged particles, or "radiant matter") technology can increase the energy of the process gas between two to 10 times higher than conventional combustion. Due to the extreme temperatures reached with the addition of plasma to the gasification or pyrolysis processes, the feedstock (i.e., MSW) needs limited preparation (i.e., separation) prior to gasification and is greatly reduced in volume through the process. The plasma reactors are large and operate at a slightly negative pressure, meaning that the feed system is simplified because the gas cannot escape. The gas has to be pulled from the reactor by the suction of the compressor. Each reactor can process 20 tons of MSW per hour compared to 3 tons per hour for typical gasifiers. Because of the size and negative pressure, the feed system can handle bundles of material up to one meter in size. This means that whole bags of waste can be fed directly into the reactor making the system ideal for large-scale production. Unlike the processes without plasma, gasification occurs in the absence of or in negligible amounts of oxygen, which results in fewer byproduct gases being formed.

The basics of plasma technology are straightforward. First, bulk metals are removed, and the rest of the waste is conveyed to a 1,290 ºF gasification chamber. Most of it volatilizes to a complex blend of gases and rises toward a plasma torch operating at 2,190 ºF, powerful enough to disintegrate the waste into its component elements. The plasma reduces the complex blend to a few simple gases, such as steam, carbon monoxide, hydrogen, and nitrogen (N). Small amounts of chlorine (Cl), hydrogen sulfide (H_2S), particulates, carbon dioxide, and metals with boiling points less than 2,280 ºF are contained in the gas. Because of the low-oxygen atmosphere and high temperature, the base elements of the gas cannot form toxic compounds such as furans, dioxins, NO_x, or sulfur dioxide in the reactor.

The byproducts of plasma gasification/pyrolysis are a glass-like substance, or slag, used as raw material for high-strength asphalt or household tiles and syngas. The slag is then pushed to another plasma torch, which drives off remaining carbon in the slag before it cools and turns into a glassy substance (vitrifies). The resulting glass can be blended into asphalt road surfacing or cement. Syngas is a mixture of hydrogen and carbon monoxide and it can be converted into fuels such as hydrogen, natural gas or ethanol. Syngas (which leaves the converter at a temperature of around 2,200 ºF) is fed into a cooling system which generates steam. This steam is used to drive turbines which produce electricity, part of which is used to power the converter, while the rest can be used for the plant's heating or electrical needs.

2.2.4 Alternative 4 – Incineration

Incineration is the oldest alternative to disposal of MSW in landfills. It uses high-temperature combustion of waste (at 1,562 °F and higher) with a sufficient supply of oxygen. Combustion of MSW, particularly through WTE facilities, can be an important component of a local government's waste management practices. As of 1993, approximately 207 million tons of MSW were generated annually in the U.S., 16 percent of which (33 million tons) was combusted. There are approximately 150 municipal waste combustors in the U.S., 80 percent of which are WTE facilities; the remaining 20 percent incinerate waste without recovering energy (USEPA 1995).

Incineration of MSW converts the waste into ash, flue gas, and heat. The ash is mostly formed by the inorganic constituents of the waste, and may take the form of solid lumps or particulates carried by the flue gas. Flue gas is the gaseous combustion product from the incineration furnace. The flue gases must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere. In a study from 1994, Delaware Solid Waste Authority found that, for the same amount of produced energy, incineration plants emitted fewer particles, hydrocarbons and less sulfur dioxide (SO_2), hydrogen chloride (HCl),carbon monoxide (CO) and nitrogen oxides (NO_x) than coal-fired power plants, but more than natural-gas-fired power plants.

Incinerators reduce the solid mass of the original waste by 80 to 85 percent and the volume (already compressed somewhat in municipal waste trucks) by 95 to 96 percent, depending on composition and degree of recovery of materials, such as metals from the ash, for recycling.

New and existing incinerator systems require the proper controls for combustion and air pollution control to receive an operating permit. This has reduced the past concerns about health and the environment surrounding these facilities, including odor emissions. Incinerator regulations in the twenty-first century are considered the most stringent of all types of combustion and energy recovery systems. They are also the most protective for the health and environment of local communities (Advameg, Inc. 2011).

2.2.5 Dyess Specific WTE Plant Components

The WTE plant at Dyess AFB would occupy about 5.6 acres and while a specific design has not yet been chosen, would notionally consist of five main functional areas: an entrance and exit access road; a truck tipping area; a waste transfer station; the gasification facility; and electrical equipment and power lines (Figure 2-2). The total acreage is 6.7 acres, but a back-up generator facility occupies about 2 acres.

With the long axis of the site oriented north to south, the northern end would adjoin Military Drive. Chain link fencing (8 feet high) topped by protective barbed/razor wire would surround the site and link to existing security fencing for the base. Both an entrance and exit gate would provide secure access from Military Drive, promote efficient ingress and egress for MSW trucks, and help reduce potential traffic delays on Military Drive.

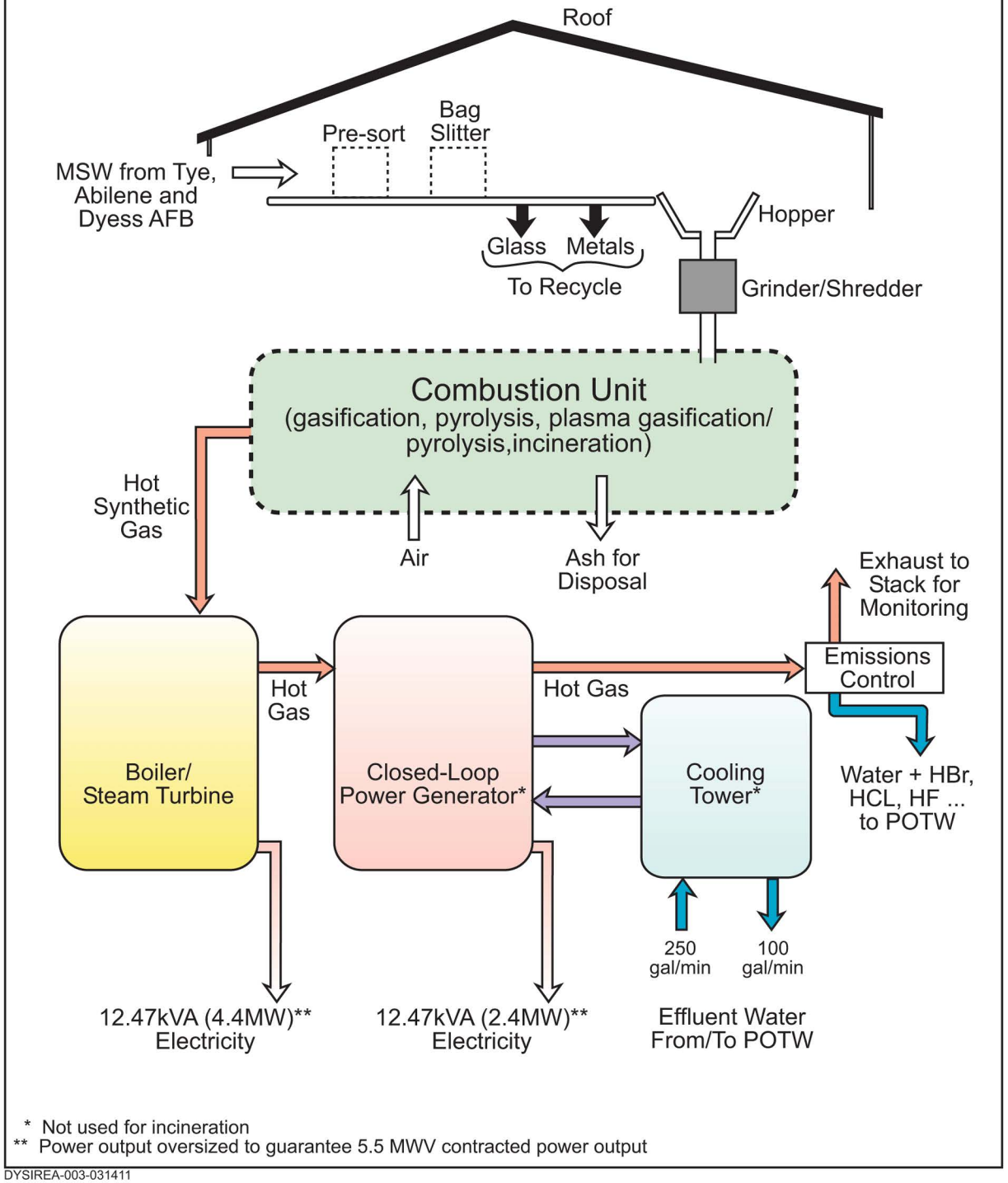

Figure 2-2. Generalized WTE Plant Process

A paved truck tipping area would provide access to the waste transfer station for off-loading MSW. Covering approximately 1 acre, this area would permit more than one waste transport truck to operate simultaneously and would allow access from the entrance road. Waste used in the WTE process would enter the site via transport trucks provided independently by the City of Abilene, the City of Tye, and Dyess AFB. Incoming trucks would be weighed upon entering the site. Each truck would also be weighed empty after their first visit to the plant, and this tare weight would be used for all subsequent trips to the plant. Plant operators would record the weight of each load to document the amount of waste received and to quantify waste reduction efforts on the part of Dyess AFB. Load weight records for each shipment would be logged by origination source (City of Abilene, City of Tye, or Dyess AFB), maintained, and reported to TCEQ under 30 Texas Administrative Code (TAC) Chapter 330, Subchapter P. The transfer station and associated energy recovery process would be classified as "facilities and processes, not for disposal." As such, disposal fees would not be required.

The third functional area would consist of the waste transfer station. All MSW waste handling operations would be conducted within an enclosed building that is protected from adverse weather conditions (e.g., wind or rain) and equipped with modern air-handling and biofilter odor controls. The waste transfer station would house the tipping floor, but also include short- and long-term MSW storage, an MSW conveyor and sorting stations, recycling capabilities, shredders, and a walking floor. The waste transfer station would sort and process the MSW prior to its input into the gasification facility. The tipping floor would permit a truck containing MSW to drive into the facility, and "tip," or offload, its contents onto an unloading floor. The MSW would be pushed via a ram system onto a conveyor. The loading dock would also have doors that would remain closed when not accommodating a truck. An enclosed area would be designated as the long-term storage area adjacent to the waste transfer station. The entire site would be fenced to ensure security and windblown materials are contained.

The interior of the waste transfer facility would house an MSW conveyor capable of moving an average of 125 tons of MSW per day. A leveler would spread the MSW out on the conveyor. Sorting and recycling stations would be positioned along the conveyor to remove recyclable materials (e.g., glass, metal, aluminum) and unacceptable waste such as batteries, oils, aerosols, and paints. These items would be removed automatically and/or by sorting personnel and placed in appropriate bins or containers; hazardous materials, volatile chemicals, and flammable constituents would be collected in a manner consistent with federal and state regulations. The conveyer could also employ mechanical means of sorting (e.g., magnets), a bag slitter providing access to MSW, and a crusher to facilitate removal of glass.

At the end of the conveyor, the facility would contain a walking floor hopper designed to receive the sorted MSW. The discharge of this hopper would feed a grinder/shredder unit, which would reduce the MSW to a more uniform size for the combustion unit. The grinder/shredder would connect to a second walking floor hopper. Combined, these hoppers could store shredded and unshredded MSW. Construction of this system would include feeder equipment for transferring the shredded MSW from the second hopper to the combustion unit.

A combustion facility would comprise the fourth functional area and the heart of the WTE plant. The WTE itself would be comprised of several components that are typically used for power generation, including a combustion unit (for Alternative 3, a plasma torch would be added to the combustion unit to assist in the heating and breakdown of MSW), boiler and steam turbine, propane turbine (optional) and associated cooling towers, and exhaust scrubber. The process starts by receiving shredded MSW materials, heating them under near ambient pressure, and then thermally converting them into a gas used for heat exchange to power turbines and produce electricity. These systems would consist of an "underfed (i.e., shredded MSW input at bottom) updraft design" that burns the MSW. Generated thermal energy would be sent to a boiler to operate a steam generator. The hot gases from the exhaust of the boiler would then be piped through a heat recovery system to produce additional energy. An optional closed loop propane heat recovery system would utilize the waste heat to operate a turbine generator. The system would not burn the propane, but rather uses it as the working fluid in the turbine. The closed-loop propane system would be circulated through a cooling tower as part of the continuous loop. Propane storage of approximately 7,000 gallons would be required to maintain an estimated 2,000 gallons per minute flow through the propane system. The system would be provided with leak proof seals, but a small recovery system would be installed to capture and reuse any propane that leaks. Cooling water in the cooling tower would likely be supplied from the City of Abilene's Publicly Owned Treatment Works (POTW) reclaimed water stream but the energy provider would need to secure permission and infrastructure. Alternative 4, Incineration, would not use a closed-loop system nor require a cooling tower.

In addition to control and operational equipment, an exhaust stack and emissions monitoring equipment would be installed for the final exhaust stack. The stack and monitoring equipment would ensure that emissions are measured as specified by the appropriate regulatory agencies. Monitoring requirements and emission limits are described in 40 CFR Part 60 Subpart AAAA. The stacks would be designed to assure compliance with these regulations. Small municipal waste combustors of less than 250 tons per day of MSW are governed by this regulation. The proposed WTE would use from 125 to 250 tons per day depending on the moisture content of the waste. Small MSW Combustion Units are governed under these regulations and all of the proposed methods would be considered as such. With the exact energy process yet to be determined, the regulations need not specify how the waste is to be burned provided the provisions of the regulations are met. The limits imposed by the regulations are a maximum input of 250 tons per day of MSW to qualify for a Small Municipal Waste Combustors, and stringent exhaust outputs of air emissions. As a result, in terms of the regulations, it doesn't matter the process chosen for the WTE plant, the emissions requirements would still have to be met. Additionally; noise control measures, such as sound exhaust silencers and enclosures for the turbines including placement of the turbines within buildings would be required as part of the design to reduce noise levels at the nearest residence to 55 dB DNL. Since the noise generation would be continuous, this noise level reduction would be required to comply with the USEPA outdoor 24 hour sound equivalent level guidelines (USEPA 1978).

The last major component on the site would be the electrical equipment and power lines required to tie the generators and the power from the WTE into the base's electrical grid. It would also include the required emergency disconnect capabilities as required by the local power company. Connection into the base electrical grid would occur at the existing Substation B near the Tye Gate.

2.3 NO-ACTION ALTERNATIVE

Analysis of the no-action alternative provides a benchmark that enables decision-makers to evaluate the environmental consequences of the proposed WTE plant at Dyess AFB. Section 1502.14(d) of NEPA requires an EA to analyze the no-action alternative. No action means that the proposal, as described in the document, would not take place, and the resulting potential environmental effects of implementing the no-action alternative would be compared with the baseline conditions. In the case of this EA, the no action and baseline are the same.

Under the no-action alternative, Dyess AFB would not authorize construction or operation of a WTE plant at the base. Dyess AFB would continue to rely on the local electrical grid for its power requirements. As a result, Dyess AFB would:

- not receive the benefits of reduced electrical and solid waste disposal costs;
- continue to be vulnerable to price increases for electricity associated with price spikes during high-demand peak periods;
- continue to be vulnerable to security risks and would not achieve self-sufficiency or energy security, as a reliable 24-hour-a-day on-base source of electrical energy would not exist;
- continue to need increased landfill capacity and would not receive the benefits of reduced solid waste disposal associated with an on-base small municipal waste combustion unit; and
- not receive double credits for renewable power initiatives.

DoD Instruction 4170.10 and the National Defense Authorization Act for 2007 (10 U.S.C. 2911 (e)(1)) require that the Services reduce their electrical demands and increase their use of renewable energy sources. A no-action decision would delay the implementation of these DoD directives, would negatively affect the overall Dyess AFB energy program, and would prevent the base from achieving renewable energy goals and enhanced energy security.

2.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA examines the affected environment for Dyess AFB, considers the potential effects of the proposed action, and compares those to current conditions under the no-action alternative. The steps involved in the environmental impact analysis process used to prepare this EA are outlined below.

1. *Conduct Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).* IICEP requires comments to be solicited from local governments as well as federal and state agencies to ensure their concerns and issues about the proposed energy security and conservation projects at Dyess AFB are included in the analysis. It also requires that the public in the region local to the proposed action be solicited for their comments. In December 2010, the Air Force

sent IICEP letters to these agencies requesting their input on Dyess AFB's proposal. Chapter 6 provides the list of people and agencies contacted and Appendix A provides copies of IICEP correspondence.

2. *Prepare a draft EA.* The first comprehensive document for public and agency review is the draft EA. This document examines the environmental impacts of the proposed action and no-action alternative.

3. *Announce that the draft EA has been prepared.* An advertisement was posted in the *Abilene Reporter-News* on May 19, 2011 notifying the public as to the draft EA's availability for review at the Abilene Public Library. Information about the draft EA and public comment period was also posted to the Dyess AFB public website.

4. *Provide a public comment period.* The goal during this process is to solicit comments concerning the analysis presented in the draft EA. A 30-day public comment period began on May 19, 2011 when notification of the document availability was announced in the *Abilene Reporter-News*.

5. *Prepare a final EA.* Following the public comment period, a final EA was prepared. This document was a revision (if necessary) of the draft EA, includes consideration of public comments, and provides the decision maker with a comprehensive review of the proposed action and no-action alternatives and the potential environmental impacts of implementing either action.

6. *Issue a Finding of No Significant Impact (FONSI).* The final step in the process is either a FONSI, if the analysis supports this conclusion, or a determination that an EIS would be required for the proposal.

2.5 OTHER REGULATORY AND PERMIT REQUIREMENTS

This EA has been prepared in compliance with NEPA, other federal statutes, such as the Clean Air Act (CAA), the Clean Water Act (CWA), Endangered Species Act, and the National Historic Preservation Act, Executive Orders, and other applicable statutes and regulations.

2.6 MITIGATION MEASURES

In accordance with 32 CFR 989.22, the Air Force must indicate if any mitigation measures would be needed to implement the proposed action or any alternative selected as the preferred alternative under this environmental assessment. However, no mitigation measures are anticipated to be needed to arrive at a finding of no significant impact if any of the alternatives analyzed under the proposed action were selected for implementation at Dyess AFB.

2.7 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

According to the analysis in this EA, implementation of the proposed action or alternative would not result in significant impacts to the following environmental resources: air quality; hazardous materials and hazardous waste; soils and stormwater; biological resources; socioeconomics; transportation; and

utilities. Implementing the proposed action would not significantly affect existing conditions at Dyess AFB. Table 2-2 summarizes and highlights the result of the analysis by resource category.

Table 2-2. Summary of Potential Environmental Impacts

Resource	*WTE Plant Project*	*No-Action Alternative*
Air Quality	***Alternative 1:*** All of the criteria pollutants analyzed in this EA are below the PSD limit of 250 tons per year. Regardless of the final WTE plant design, compliance with the Texas Commission on Environmental Quality (TCEQ) permit conditions would be mandatory. These permit conditions are established to ensure the combustion of MSW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality. Local emissions would be at levels well below federal and Texas air quality standards. ***Alternatives 2-4:*** Although each alternative process would emit different amounts of pollutants, each alternative would also be below the PSD limit and each alternative would be required to comply with TCEQ regulations.	Baseline emissions would remain unchanged and Dyess AFB would continue to operate under 30 TAC 122.122.
Hazardous Materials and Hazardous Waste	***Alternative 1:*** Expected wastes of the WTE would be glass, metals, household hazardous waste, and the combustion ash, from the first stage of the gasification process. Some of these items are recyclable, while others would be returned to the generator, and ultimately, sent to a properly permitted accepting disposal facility. The first stage byproducts are not expected to be hazardous waste, but would be tested using standard hazardous waste testing protocols prior to disposal. Depending on the results, the byproducts would be sent to the appropriate disposal facility. Very small quantities of WTE maintenance waste (e.g., oily rags, adhesives) would be generated and would be handled in accordance with the Dyess AFB *Integrated Waste Management Plan.* ERP sites on the base would not be affected. ***Alternative 2:*** Biochar would be the waste generated from a pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 3:*** Glass slag would be the solid combustion by-product from a plasma gasification/pyrolysis plant. All other wastes would be similar to Alternative 1. ***Alternative 4:*** Similar to Alternative 1, combustion ash results from an incineration plant. Other wastes would also be similar to Alternative 1.	Existing procedures for the management, procurement, handling, storage, and disposal of hazardous materials used on Dyess AFB would remain unchanged. Hazardous materials and hazardous waste procedures would remain unchanged under baseline conditions.
Soils and Stormwater	***Alternative 1:*** Impacts to soils would be negligible, as would water resource impacts. Construction would disturb about 5.6 acres, but best management practices such as silt fencing and soil surface watering would minimize erosion and runoff. No adverse impact to soils and water resources would occur with implementation of the proposed action. A site specific storm water permit and a Stormwater Pollution Prevention Plan would be obtained prior to construction. ***Alternatives 2-4:*** Impacts to soils and stormwater would be identical under all alternatives.	There would be no change to the current conditions of soil and water resources on Dyess AFB with implementation of the no-action alternative.

Table 2-2. Summary of Potential Environmental Impacts (con't)		
Resource	***WTE Plant Project***	***No-Action Alternative***
Biological Resources	***Alternative 1:*** Approximately 5.6 acres of vegetation and habitat would be disturbed. The area is mesquite woodlands and partially disturbed to some degree. No wetlands exist in the vicinity of the proposed action; therefore, no impact to these resources would occur. A preconstruction survey would find and relocate any Texas horned lizards; therefore, no adverse impacts to special-status species would be expected. ***Alternatives 2-4:*** Impacts to biological resources under Alternatives 2 through 4 would be the same as Alternative 1.	No changes to existing conditions of vegetation or wildlife would occur since no construction activities would occur. No wetlands are found in the existing area, thus no impacts to wetland resources would occur. No changes to existing conditions of special-status species would occur.
Socioeconomics	***Alternative 1:*** Construction activities would result in minor, short-term positive input into to the local economy. Initially, operation of the WTE would result in the creation of seven new jobs, and could increase as operations continue. Producing electricity on-site versus purchasing it wholly through the regional energy provider would virtually eliminate line losses of energy and may provide energy cost savings. ***Alternatives 2-4:*** Socioeconomic impacts due to these alternatives would be the same as for Alternative 1.	Under the no-action alternative, no changes to regional socioeconomics would be expected as conditions would remain unchanged from existing conditions.
Transportation	***Alternative 1:*** MSW truck traffic would require about 30 round trips per weekday. Compared to the existing traffic, the contribution of the proposed action traffic would be less than 0.38 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 2:*** Under this alternative, MSW truck traffic would require about 36 round trips per weekday. The contribution of traffic under Alternative 2 would be less than 0.49 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 3:*** Under this alternative, MSW truck traffic would require about 25 round trips per weekday. The contribution of traffic under Alternative 3 would be less than 0.35 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive. ***Alternative 4:*** Under this alternative, MSW truck traffic would require about 44 round trips per weekday. The contribution of traffic under Alternative 4 would be less than 0.60 percent of the current traffic volume along Farm-to-Market (FM) 3438 and Military Drive.	No impacts to transportation resources would occur through implementation of the no-action alternative.
Utilities	***Alternative 1:*** The WTE plant would require 250 gallons per minute of water to cool the optional closed-loop propane system and discharge approximately 100 gallons of recycled per minute to the City of Abilene Publicly Owned Treatment Works. The WTE operator would be required to obtain utilities independent from Dyess AFB and would also be required to obtain all the necessary permits required for WTE plant operations. No changes to Dyess AFB's current water or wastewater use would be required for the proposed action. ***Alternative 2-3:*** Under these alternatives, approximately the same amount of water and wastewater would be used as Alternative 1. ***Alternative 4:*** This alternative would use incineration to produce power and this technology would not lend itself well to using the optional closed-loop propane system and water use would be much less for this alternative.	No changes to current water use or wastewater services would occur.

CHAPTER 3

AFFECTED ENVIRONMENT

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CHAPTER 3
AFFECTED ENVIRONMENT

3.1 ANALYSIS APPROACH

NEPA requires focused analysis of the areas and resources potentially affected by an action or alternative. It also indicates that an EA should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. Therefore, an EA should not be encyclopedic; rather, it should be succinct. NEPA also requires a comparative analysis that allows decision-makers and the public to differentiate among the alternatives. This EA, therefore, focuses on those resources that would be affected by the proposed construction and operation of the WTE plant at Dyess AFB, Texas.

CEQ regulations (40 CFR Parts 1500-1508) for NEPA also require an EA to discuss impacts in proportion to their significance and present only enough discussion of other than significant issues to show why more study is not warranted. The analysis in this EA considers the current conditions of the affected environment and compares those to conditions that might occur should either the proposed action or no-action alternative be implemented.

Resources Analyzed

Table 3-1 presents the results of the process of identifying resources considered in this EA. This assessment evaluates air quality, hazardous materials and hazardous waste, soils and stormwater, biological resources, socioeconomics, transportation, and utilities. These resources have shown to be potentially affected by implementation of the proposed action. Each resource discussion is organized as follows: a definition of the resource including the affected area and the applicable regulations; and a description of the existing environmental conditions to provide a context for impacts, presented in Chapter 4.

Table 3-1. Resources Analyzed in the Environmental Impact Analysis Process				
Resource	***Potentially Affected by WTE Plant***		***Detailed Analysis in this EA***	
	Construction	*Operations*	*Yes*	*No*
Physical Resources				
Air Quality	✓	✓	✓	
Hazardous Materials and Hazardous Waste	✓	✓	✓	
Soils and Stormwater	✓	✓	✓	
Biological Resources				
Vegetation, Wildlife, and Wetlands	✓		✓	
Special-Status Species	✓	✓	✓	
Human Resources				
Socioeconomics	✓	✓	✓	
Transportation	✓	✓	✓	
Utilities	✓	✓	✓	
Airspace				✓
Cultural and Traditional Resources				✓
Land Management, Use, and Recreational Resources				✓
Health and Safety				✓
Noise				✓
Visual				✓
Environmental Justice				✓

Resources Eliminated from Further Analysis

The Air Force assessed numerous resources (Table 3-1) that, in accordance with CEQ regulations, warranted no further examination in the EA. The following describes the rationale for this approach.

Airspace. Airspace management and air safety are interrelated topics. Airspace management addresses how, and in what airspace, aircraft fly. Air safety evaluation criteria include airspace operations and traffic management, as well as aircraft systems reliability. Activities associated with the construction and operation of the proposed power generating facilities would not have an impact on either the management of the airspace or operations within the airspace. As an enclosed facility using current, advanced technology ventilation, it would not be an attractant to birds and it would not exceed height requirements for obstructions. These resources were eliminated from further analysis.

Cultural and Traditional Resources. No known cultural or traditional resources occur within the area of potential effect (APE) proposed for construction of the WTE as defined by the 5.6 acre site shown on Figure 2-1. Dyess AFB submitted an Archaeological Needs Assessment to the State Historical Preservation Officer (SHPO) on April 29, 2011. The report provided a status of current archaeological investigations and recommended that no additional surveys were required. SHPO concurred on June 1, 2011. Based upon the fact that no historical or archaeological resources exists within the APE no adverse effects to cultural resources are anticipated. Additionally, construction contractors will be required to comply with Standard Operating Procedures in the event of inadvertent discovery of cultural artifacts. Therefore, further detailed analysis of cultural and traditional resources is not warranted.

Land Management, Use, and Recreational Resources. The base includes developed and undeveloped lands. Main categories of developed land uses include airfield and flightline, industrial areas, administrative facilities, housing, recreation sites, and medical facilities. Undeveloped lands are commonly called open space in planning documents and may include grazing areas, golf courses, natural or cultural resource preservation sites, safety buffers, or other similar land uses. The location for the proposed WTE is in a partially disturbed area adjacent to land designated for industrial purposes. Future planning would have to address this minor change to land designation. Therefore, implementation of the proposed action would not affect or conflict with current land management and use, or recreational resources and does not require further analysis is this EA.

Health and Safety. Effects to human health and safety related to construction, as well as operations and maintenance, would be minimal and no different from standard, on-going activities occurring at Dyess AFB. During construction, prescribed industrial safety standards and best management practices would be followed. Operations and maintenance activities would be performed in accordance with all applicable safety directives. Since the waste management area of the WTE plant would be enclosed and maintained at a slight negative pressure, and designed with modern air-handling and biofilter odor controls, there would be no Bird/Wildlife Aircraft Strike Hazards associated with the proposed action. There are no other specific aspects of the WTE plant facilities, operations, or maintenance activities that would create any unique or extraordinary safety issues. Since no aspect of the proposal would alter the safety conditions for the base, this resource has been eliminated from further analysis.

Noise. Although the WTE plant would emanate noise, the noise level would be primarily due to the gas turbine and the cooling tower fans. Noise measurement data for the gas turbines is not available, but the turbines would be installed in enclosures within an enclosed facility. Both the turbine enclosure and the building would attenuate (lessen) the noise. The cooling towers are typically installed with low noise fans.

The proposed WTE plant would be located in a portion of the base just outside the 65 decibels (dB) Day-Night Average Sound Level (DNL). More importantly, the residences nearest the WTE (3,700 feet) also lie within 1,000 to 2,000 feet from the flight path of Dyess AFB where noise levels are approximately 70 to 75 dB DNL. Additionally, WTE sound enclosures would be designed to comply with USEPA outdoor 24-hour noise exposure guidelines of 55 dB DNL.

Truck traffic associated with MSW delivery would generate noise (i.e., 50 to 70 dB at 50 feet distance); however, the traffic would normally approach the WTE plant from the east, enter the facility and return the same way. The nearby residences reside to the west, including the City of Tye, and would not be affected by the truck noise. Such noise would be attenuated by distance, with the noise decreasing by 6 dB for every doubling of distance.

Since the nearest recipient for noise would be over one half mile away and the noise levels would be attenuated by enclosures and distance and the current noise levels are at approximately 65 dB DNL, the noise impacts are expected to be inconsequential and are not addressed further in this document.

Visual. The proposed location for the WTE plant would be in an area without any unique, distinctive, or aesthetically exceptional qualities. While the proposed energy conservation facilities would be visible from off-base, the proposed action is not expected to impact the visual environment of the base or its surrounding area or require further analysis.

Environmental Justice. Environmental justice addresses the disproportionate effect a federal action may have on low-income or minority populations. Executive Order (E.O.) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations ensures the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The existence of disproportionately high and adverse impacts depends on the nature and magnitude of the effects identified for each of the individual resources. The affected area includes the proposed location of the WTE plant within the confines of Dyess AFB and the region affected by noise and air emissions from the gas turbine and cooling tower fans of the WTE plant. Noise from construction activities would be short-term in duration. As described above, the turbines would be installed in enclosures within an enclosed building; thereby, reducing noise levels at the nearest off-base residence. Local air emissions from WTE plant construction, operation, and associated vehicular transport activities would not approach any state or federal thresholds for the protection of human health and safety (see Section 3.2.1, Air Quality).

Most air emission concentrations would comprise just a small percentage of the allowable standards and no adverse impacts to the local area would occur. Since no significant, adverse environmental impacts associated with the proposed action would occur, no populations (minority, low-income, or otherwise) would be disproportionately adversely impacted and no significant impact with regard to environmental justice would result. Therefore, since no minority or low-income groups would be affected disproportionately or placed at risk by implementing the proposed action or no-action alternative, environmental justice as a resource was eliminated from further analysis.

3.2 PHYSICAL RESOURCES

This section includes discussions of air quality, hazardous materials and hazardous waste, and soils and stormwater resources. Physical resources are also known as media resources because the contaminant affects the physical media without changing the general physical characteristics of the media. Physical resources are also some of the most regulated because contaminants present can move with the media spreading the contamination to other locations. The region of influence for physical resources usually extends beyond the project boundary for this reason. Because these resources are so highly regulated, the significance criteria are often based on regulatory limits allowed by the proposal.

3.2.1 Air Quality

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted

into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions.

The 1970 CAA and its subsequent amendments (CAAA) established the National Ambient Air Quality Standards (NAAQS) for "criteria" pollutants: ozone (O_3), CO, nitrogen dioxide (NO_2), SO_2, particulate matter equal to or less than 10 microns (PM_{10}, particulate matter equal to or less than 2.5 microns ($PM_{2.5}$), and lead (Pb). These standards, presented in Table 3-2, represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. Short-term standards (1-, 8-, and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.

Table 3-2. National Ambient Air Quality Standards

Pollutant	***Averaging Time***	***Primary***	***Secondary***
O_3	8 Hour	0.075 ppm	Same as Primary
CO	1 Hour (Maximum)	35 ppm	--
	8 Hours (Maximum)	9.0 ppm	--
NO_2	Annual	0.053 ppm	Same as Primary
	1 Hour	0.100 ppm	--
SO_2	Annual Mean	0.030 ppm	--
	24 Hour Maximum	0.14 ppm	--
	3 Hour Maximum	--	0.5 ppm
	1 Hour	75 ppb	--
PM_{10}	Annual Mean	--	--
	24 Hours	150 $\mu g/m^3$	Same as Primary
$PM_{2.5}$	Annual 24-Hour Mean	15 $\mu g/m^3$	Same as Primary
	24 Hour	35 $\mu g/m^3$	Same as Primary
Pb	Calendar Quarter	0.15 $\mu g/m^3$	Same as Primary

Pollutants considered in the analysis for this EA include the criteria pollutants measured by federal standards. Based on measured ambient criteria pollutant data, the USEPA designates all areas of the U.S. as having air quality that has not been measured (unclassifiable), better than (attainment), or worse than (nonattainment) the NAAQS. Dyess AFB and adjacent Abilene, Texas are in an area designated as unclassifiable or in attainment for all criteria pollutants (40 CFR 81.344). The CAA also establishes a national goal of preventing degradation or impairment in any federally designated Class I area. As part of the PSD program, mandatory Class I status was assigned by Congress to all international parks, national wilderness areas, memorial parks greater than 5,000 acres and national parks greater than 6,000 acres in existence in 1977. In Class I areas, visibility impairment is defined as a reduction in visual range and atmospheric discoloration. Stationary sources, such as industrial complexes, are typically an issue for visibility within a Class I PSD area. For new sources that may impair visibility or degrade air quality, applicants may be required to analyze potential impacts to Class I areas within 100 kilometers (62 miles) of the source. Dyess AFB is located greater than 300 miles from the closest Class I areas (Big Bend National Park and Guadalupe Mountains National Park) so Class I area impacts are not further analyzed in this EA.

Hazardous Air Pollutants (HAPs) are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects and are also known as air toxics or toxic air pollutants. National Emission Standards for HAPs set rules on the amounts of HAPs that a facility can emit. USEPA has issued rules covering over 96 categories of major industrial sources, such as chemical plants, oil refineries, aerospace manufacturers, and steel mills, as well as categories of smaller sources, such as dry cleaners, commercial sterilizers, secondary lead smelters, and chromium electroplating facilities. These standards are projected to reduce annual air toxics emissions by about 1.7 million tons.

An area generator is the lower classification where a generator can emit no more than ten tpy of any one HAP and 25 tpy of total HAPs. Exceeding these limits puts a generator in the major source category. The requirements for a major source are much more stringent and involve Maximum Achievable Controls Technology (MACT). This means that for all new sources of HAPs on a facility need to include costly emission controls to reduce the production of HAPs to the lowest level achievable. Additionally, any remodeling of old facilities need to be retrofitted with the MACT controls. From a regulatory and cost point of view, it is extremely desirable to remain an area generator versus a major source. The regulated amount of HAPs comprise those emissions sources with a *potential to emit* greater than TCEQ federally enforceable thresholds set forth in Dyess' AFB PI-8 limits rather than what the source actually emits. For example, jet engine testing emits a variety of emissions, but only during testing activities. Each year the amount of time testing jet engines is unknown but given the number of aircraft and other factors, an estimate is made and submitted to TCEQ as a potential to emit. These hours are usually conservative to allow flexibility in the event that more testing than anticipated may be required. The actual emissions in a given year are often quite less than the potential to emit. Dyess AFB uses a rolling 12 month total to track emissions. HAP emissions for the year ending September 2010 was 2.939 tpy (personal communication, Armstrong 2011).

The USEPA regulates and provides standards for new stationary sources in 40 CFR Part 60. For new Small Municipal Waste Combustion Units, the New Source Performance Standards are found in Subpart AAAA of 40 CFR 60.1000-60.1465 (Table 3-3). Key provisions of these standards must be met for the operation of the WTE plant. There are five main components of the standards: a) preconstruction requirements, b) good combustion practices, c) emission limits, d) monitoring and stack testing, and e) recordkeeping and reporting.

- A Materials Separation Plan and Siting Analysis are required for the preconstruction standard. The Materials Separation Plan details the process for collecting and receiving waste, separating recyclable material from the combustible materials, and how recyclables would be available for buyback. The Siting Analysis addresses how the proposed plant would affect ambient air quality, visibility, soils, vegetation, and other relevant factors.
- The good combustion practices portion of the standard includes operator training and certification and operating requirements.

- The Emissions Limits and Monitoring standards set the limits on the types and quantities of allowable emissions. These limits would be monitored and tested. The standard includes how the emissions would be sampled and the test methods used for analysis. Table 3-3 lists emissions, test methods, and monitoring limits.
- The Recordkeeping Standard requires that the Materials Separation Plan, the Siting Analysis, the operator training and certifications, the stack tests, the continuously monitored emissions, and the carbon feed rate all be kept on site for at least 5 years and available for inspection.

Table 3-3. Dyess AFB WTE Plant Project Air Emission Test Requirements

Pollutant	*NSPS AAAA Limit*[1]	*Averaging Time*	*Compliance Method*	*Notes*
NO_x - Class II Units	500 ppm by dry volume	No monitoring, testing, recordkeeping, or reporting is required to demonstrate compliance with the nitrogen oxides limit for Class II units.		N/A
SO_2	30 ppm or 80% reduction	24-hour daily block geometric average concentration or percent reduction	Stack Test	N/A
CO	155 ppm (24-hours daily)	3-run average (min. 1-hr run)	Stack Test	N/A
Dioxins/Furans (total mass basis)	13 ng/dscm	3-run average (min. 4-hr run)	Stack Test	Must operate at full load. Must also speciate all 2, 3, 7, and 8 laterally substituted isometers.
Cadmium	0.02 mg/dscm	3-run average (run duration specified in test method)	Stack Test	Must operate at full load.
Pb	0.2 mg/dscm	3-run average (run duration specified in test method)	Stack Test	Must operate at full load.
Mercury	0.08 mg/dscm or 85% reduction	3-run average (run duration specified in test method)	Stack Test	Must operate at full load.
Opacity	10%	Thirty 6-minute averages	Stack Test	3-hour observation period.
Particulate Matter per NSPS Subpart AAAA	24 mg/dscm	3-run average (run duration specified in test method)	Stack Test	Min. sample vol. must be 1 m3. Heating systems in sample train must be set to provide a gas temp. <160+/-14°C. Must operate at full load.
Hydrogen Chloride	25 ppm or 95% reduction of HCL	3-run average (min. 1-hr run)	Stack Test	Must operate at full load.
Fugitive Ash	Visible emissions for no more than 5 percent of hourly observation period	Three 1-hour observation periods	Visible emission test	

Source: Table 1 of Subpart AAAA of Part 60 – Emission Limits for New Small Municipal Waste Combustion Units.
Notes: [1]All emission limits (except for opacity) are measured at 7 percent oxygen.
dscm = dry standard cubic meter
mg = milligrams
ng = nanograms
ppm = parts per million

Federal and Texas regulations also allow for emission sources to be permitted under what is known as a Permit by Rule (PBR). Sources that can be started under a PBR have to meet certain emission limits to fall into this category. The general requirements are listed in TAC 30, Chapter 106, Subchapter A and include emission limits of 250 tpy of CO or NO_x or 25 tpy of volatile organic compounds (VOC) or SO_2 or inhalable PM_{10}; or 25 tpy of any other air contaminant except carbon dioxide, water, nitrogen, methane, ethane, hydrogen, and oxygen. Individual sources would fall under the subsequent subchapters. Among the key subchapters potentially applicable to the proposed action are PBRs include Subchapter U, *Tanks, Storage and Loading*, and Subchapter W, *Turbines and Engines.*

Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural process as well as human activities. The accumulation of GHGs in the atmosphere regulates the earth's temperature. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe.

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). A primary example of GHGs created and emitted primarily through human activities includes the combustion of fuel in engines. Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, under the USEPA's Mandatory Greenhouse Gas Reporting Rule, CH_4 has a GWP of 21, which means that it is considered to have a global warming effect 21 times greater than CO_2 on an equal-mass basis. N_2O has a GWP of 310. Total GHG source emissions are often reported as a CO_2 equivalent (CO_2e). The CO_2e is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs.

Affected Environment

Air quality relative to the proposal has two regions of influence. Regionally, the USEPA and TCEQ monitor and reports emission levels by county in this part of Texas, therefore the regional area of influence would be Taylor County, TX. The localized region of influence would be the neighborhoods nearest to the proposal, in this case, Tye City, TX.

Dyess AFB is located in Taylor County, Texas, and its air quality is under the jurisdiction of the TCEQ. Emissions at the base are permitted under TCEQ Title 30, TAC 122.122 (TCEQ 2001). Stationary source emissions at Dyess AFB include jet engine testing, external and internal combustion sources, degreasing

operations, storage tanks, fueling operations, solvent usage, surface coating, firefighter training, and miscellaneous general process operations. Mobile source emissions include aircraft operations, (takeoff and landings), aerospace ground equipment (AGE), and ground support equipment. Emissions from aircraft takeoff and landing operations, as well as other flight operations at the base include both based and transient aircraft. Total emissions at the base are presented in Table 3-4.

Table 3-4. Baseline Emissions for Dyess AFB Affected Environment

	Pollutants (tpy)				
	CO	*VOCs*	*NO_x*	*SO_2*	*PM_{10}*
Total Base Emissions[1]	12.23	15.50	13.39	0.33	3.75

Sources: [1]Dyess AFB – *Dyess AFB 12-Month Rolling Total Base Emissions* (September 2010).

3.2.2 Hazardous Materials and Hazardous Waste

Hazardous materials are identified and regulated under the Comprehensive Environmental Response, Compensation and Liability Act; the Occupational Safety and Health Act (OSHA); and the Emergency Planning and Community Right-to-Know-Act. The Resource Conservation and Recovery Act (RCRA) defines hazardous waste as any solid, liquid, contained gaseous or semisolid waste, or any combination of waste that could pose a substantial hazard to human health or the environment. Hazardous materials are identified in Air Force Instruction 32-7086, *Hazardous Materials Management* (Air Force 2004), as any substance with special characteristics that could harm people, plants, or animals when released. Waste may be classified as hazardous because of its toxicity, reactivity, ignitability, or corrosiveness. In addition, certain types of waste are listed or identified as hazardous in Code of Federal Regulations at 40 CFR 261.

Affected Environment

The region of influence for the proposed action would be the WTE plant site, transportation routes, and disposal sites.

Operations at Dyess AFB require the use and storage of many hazardous materials. These materials include flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, pesticides, petroleum hydrocarbons, batteries, hydraulic fluids, fire retardant, and photographic chemicals. The Dyess AFB *Integrated Material Management Plan* (IMMP) describes the requirements for acquisition, storage, and use of hazardous materials (Dyess AFB 200a) The Dyess AFB *Integrated Waste Management Plan* (IWMP) specifies protocols for accumulated locations on the base and proper handling procedures for all hazardous wastes (Dyess AFB 2005).

Protocols described in the IWMP include spill detection, spill reporting, spill containment, decontamination, and proper cleanup and disposal methods. Hazardous waste is generated at Dyess AFB from a variety of activities, including aircraft maintenance, soil and groundwater remediation, training exercises, civil engineering projects, printing, medical facility, services, and security. Aircraft support functions are a major source of hazardous waste at Dyess AFB. These functions include corrosion control, fuels management, hydraulics, structural maintenance, aerospace ground equipment, painting, munitions maintenance, and wheel and tire maintenance.

The USEPA designates facilities as large quantity generators of hazardous waste when wastes generated exceed 2,200 pounds any month during the year. Dyess AFB is designated as a large quantity generator of hazardous wastes. In keeping with the requirements outlined in the Dyess AFB IWMP, hazardous waste is properly segregated, accumulated, characterized, labeled, and packaged for collection at a designated initial accumulation point. Dyess AFB contracts out responsibility for removing hazardous waste and non-hazardous waste from the on-base initial accumulation points. The waste is then transferred to one of two designated 90-day accumulation sites located in buildings 5205 and 4313.

Accumulated wastes gathered at a 90-day site are analyzed, characterized, prepared for shipment, and the contractor arranges for permanent disposal. A third facility (Building 9150) is available for emergency backup when buildings 5205 and 4313 are full (Dyess AFB 2005).

Environmental Restoration Program

The ERP is the process by which contaminated sites and facilities are identified and characterized and by which existing contamination is contained, removed, and disposed of to allow for beneficial reuse of the property. Examples of ERP sites include landfills, underground waste fuel storage areas (e.g., oil/water separators), and maintenance-generated wastes. Compliance activities for ERP sites address underground storage tanks, hazardous materials management, closure of active sites, polychlorinated biphenyls, water discharges, and other compliance projects that occur on or near ERP sites.

3.2.3 Soils and Stormwater

Earth resources include soil (unconsolidated) and bedrock (consolidated) materials. The analysis in this EA addressed soil and soil erosion. Potential adverse effects to soils could result from ground disturbance leading to soil erosion, fugitive dust propagation, and sedimentation. Water resources analysis was narrowed to an evaluation of stormwater that could be affected by runoff during rain events as water and recycled water are covered under Section 3.4.3, Utilities. Adverse effects to water resources could result from erosion, runoff, and surface contamination. Effects to soils and stormwater are most likely to occur from construction activities. Water use and wastewater are covered in Utilities, Section 3.4.3.

Affected Environment

Dyess AFB is located within the Rolling Plains ecological region of Texas and consists of nearly level to gently sloping upland flats. Slopes generally range from 0 to 3 degrees. Elevation on the base ranges from approximately 1,720 feet to approximately 1,800 feet (Dyess AFB 2006b). Geology at Dyess AFB can be divided into two groups: the Permian Clear Fork Group and Quaternary Alluvium. The Permian Clear Fork Group consists mostly of silty mudstones, thin to very thinly bedded, with some blue-gray shale near the base, and a few fossil plant fragments. The Quaternary Alluvium consists of floodplain deposits of low terraces and bedrock located in stream channels with a thickness up to 25 feet (SCS 1976). The soils of Dyess AFB are composed primarily of deep, noncalcareous to calcareous clay loams. The high shrink-swell characteristic of the clays permits rapid absorption of water after extended dry periods, followed by heavy run-off when saturated (Dyess AFB 2006b).

Low-lying portions of Dyess AFB, including the golf course area, sit within the 100-year floodplain. The floodplain is associated with two features on the base – two diversion ditches and Little Elm Creek. Little Elm Creek, a tributary of the Clear Fork of the Brazos River, divides the base from its entry point at the southern end of the runway to its exit point on the east side of the base. The creek bed has been channelized to divert stormwater flow on the base into two drainage ditches (north and south) and ultimately to two outfalls on the east side of the base. Outfall 1 receives stormwater runoff from most of the industrialized portion of the base, while Outfall 2 receives stormwater from a small portion of the base, including the golf course and housing areas. The discharged water flows into Little Elm Creek, continues off-base to join Elm Creek and eventually Fort Phantom Hill Lake, the principal source of potable water supply for Abilene and Dyess AFB (Dyess AFB 2003b).

3.3 BIOLOGICAL RESOURCES

Biological resources encompass plant and animal species and the habitats within which they occur. Plant species are often referred to as vegetation and animal species are referred to as wildlife. Habitat can be defined as the area or environment where the resources and conditions are present that cause or allow a plant or animal to live there (Hall *et al*. 1997). Wetlands are considered special-category sensitive habitats. Biological resources for this EA include vegetation, wildlife, wetlands, and special-status species occurring on Dyess AFB in the vicinity of the proposed action.

3.3.1 Vegetation, Wildlife, Wetlands, and Special-Status Species

Vegetation includes all existing terrestrial plant communities with the exception of special-status species. The affected environment for vegetation includes only those areas subject to ground disturbance. *Wildlife* includes all vertebrate animals with the exception of those identified as endangered or sensitive. Wildlife includes fish, amphibians, reptiles, birds, and mammals. Wildlife also includes those bird species protected under the federal Migratory Bird Treaty Act. Assessment of a project's effects on migratory birds places an emphasis on "Species of Concern" as defined by E.O. 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds.* Additional assessment of potential impacts to migratory birds that are regionally rare occurs under the special-status category.

Wetlands are subject to regulatory authority under Section 404 of the CWA and E.O. 11990 *Protection of Wetlands.* They include jurisdictional and non-jurisdictional wetlands. Jurisdictional wetlands are those defined by the U.S. Army Corps of Engineers (USACE) and USEPA as those areas that meet all the criteria defined in the USACE's *Wetlands Delineation Manual* (USACE 1987) and under the jurisdiction of the USACE. The affected environment for wetlands includes those areas that may be potentially affected by construction and operation activities.

Special-Status Species are defined as those plant and animal species listed as threatened, endangered, or proposed as such, by the U.S. Fish and Wildlife Service (USFWS). The federal Endangered Species Act (ESA) protects federally listed, threatened, and endangered plant and animal species. Species of concern are not protected by the ESA; however, these species could become listed and therefore, protected at any time. Their consideration early in the planning process may avoid future conflicts that could otherwise

occur. The discussion of special-status species focuses on those species with the potential to be affected by construction and construction-related noise.

Affected Environment

Although this section discusses the base as a whole for the affected environment, this is used to provide a context of biological resources in the general area of the proposed action. The affected area which may be impacted by the proposed action is limited to the vicinity of the proposed WTE plant site.

The affected environment for the proposed WTE plant is located in a partially disturbed portion of the base. Developed areas include semi-improved (i.e., graveled or mowed grass) grounds adjacent to runways, taxiways, aprons, runway clear zones, etc. where periodic maintenance is performed generally for operational and aesthetic reasons, such as erosion and dust control, bird control, and visual clear zones (Dyess AFB 2006b). Potential habitat for wildlife is categorized as agricultural, wetland, developed, and undeveloped. Because natural vegetation such as grasslands, woodlands, and forests is undeveloped, it has a higher potential to support wildlife habitat. Urban, residential, and commercial areas are considered developed, providing a lower wildlife habitat potential. The area considered for proposed construction is in the mesquite woodland area of the base and has a low potential to support diverse wildlife habitat, wetlands, and special-status species.

Vegetation

The long-term effects of cultivation and urbanization have altered the regional vegetation so that the current plant community at the WTE site bears little resemblance to the historical vegetation communities (Dyess AFB 2006b). Dyess AFB consists of four distinct habitats: grassland, mesquite woodlands, marsh habitat, and disturbed (developed) habitat. Grassland species include silver bluestem, perennial threeawn, buffalograss, curly mesquite, sideoats grama, and cane bluestem. Mesquite woodlands are honey mesquites which grow in dense even-aged stands. Shade-tolerant Texas wintergrass or speargrass is the dominant groundcover within the mesquite woodlands. Red berry juniper is sparsely scattered within the mesquite grasslands in the northeaster portion of the base (Dyess AFB 2006b). The location of the proposed WTE plant consists of partially disturbed mesquite woodland.

Wildlife

Native mammalian fauna present on Dyess AFB are typical of urban environments. Mammals include cottontail, coyote, fox squirrel, black-tailed jackrabbit, and gray woodrat. A wide array of birds have been observed on the base, including red-tailed hawk, Swainson's hawk, vesper sparrow, Mourning dove, northern bobwhite, wild turkey, golden-fronted woodpecker, ladder-backed woodpecker, scissor tailed flycatcher, and red-winged blackbird. Low habitat diversity and availability preclude a high diversity and abundance of reptiles and amphibians. Those species with relatively wide niche breadth such as red-eared sliders and bullfrogs are abundant. Other species observed on Dyess AFB include the common snapping turtle, diamondback watersnake, western diamondback rattlesnake, bullsnake, Texas rat snake, and pallid spiny softshell turtle (Dyess AFB 2006b).

Wetlands

There are 12 areas on Dyess AFB currently delineated as jurisdictional wetlands. Two of them are naturally occurring playas (small depressions sometimes temporarily covered with water). Of the remaining ten, seven are the result of soil manipulation or were dug as stock watering tanks by ranchers prior to existence of the base (Dyess AFB 2006b). No wetlands occur on or near the proposed WTE site.

Special-Status Species

There are no local threatened or endangered species management obligations that the installation must adhere to in compliance with the ESA. One state-listed species, the Texas horned lizard, is known to occur at Dyess AFB. Texas Parks and Wildlife has not designated any critical habitat on base for this species, but the lizard has been observed and photographed by base personnel within a few hundred feet of the proposed site. The federally-listed endangered interior least tern and state-listed bald eagle may potentially migrate through or seasonally visit the base during wet seasons, when preferred habitat is available. Neither of these species was identified during field visits to Dyess AFB (Dyess AFB 2006b). No federally-listed bird species are known to nest at the base, nor are federally listed mammals known to occur on the base (Dyess AFB 2006b). There are no federally-listed plant species known to occur on Dyess AFB and only one state species, the Warnock's coral root, which is listed as "rare" and has no regulatory status.

3.4 HUMAN RESOURCES

Human resources for this EA focus on the general features of the local economy that could be affected by the proposed action or no-action alternative. Socioeconomics comprise the basic attributes of population and economic activity within an affected environment and typically encompasses population, employment, income, and industrial/commercial growth. Socioeconomic data provided in this section consist primarily of county-level data for Dyess AFB and the cities and towns adjacent to the base in Taylor County. Transportation focuses on the local roads in the vicinity of Dyess AFB. Utilities are the basic services required by the WTE operation, including water supply and wastewater treatment.

3.4.1 Socioeconomics

Affected Environment

The region of influence for socioeconomics are the Cities if Abilene, Tye, and Dyess AFB. These are the areas most likely to realize any socioeconomic benefits from the proposed action.

The affected environment for this action includes the cities of Abilene and Tye, as well as Taylor County (refer to Figure 1-1). Together, these communities comprise the Abilene Metropolitan Statistical Area (MSA) (U.S. Census Bureau 2006). The analysis focuses on this region because it is the area in which most of the socioeconomic effects would be experienced due to construction and operation of the WTE plant.

Population

U.S. Census Bureau data indicate that the City of Abilene and Taylor County experienced an 8.6 and 5.8 percent population increase, respectively, between 1990 and 2000 (Table 3-5).

Table 3-5. Population within the Dyess AFB Affected Environment

Area	*1990 Census*	*2000 Census*	*% Change*
City of Abilene	106,707	115,930	8.6
Taylor County[1]	119,655	126,555	5.8
Total	**119,655**	**126,555**	**5.8**

Source: U.S. Census Bureau 2006. *Note:* [1] Includes Abilene, Tye, as well as other communities within Taylor County

Employment and Earnings

As of April 2006, the unemployment rate in the Abilene MSA was 4.1 percent (Texas A&M University 2006). During the period April 2005 to April 2006, the construction sector in the Abilene MSA experienced a 10.7 percent increase. Employment in the region is primarily dominated by service, retail trade, local government, and manufacturing. Dyess AFB is the largest employer in Taylor County with 5,810 employees, followed by Hendrick Health System (2,761 employees), Abilene Independent School District (2,698 employees), Abilene State School (1,230 employees), and the City of Abilene (1,197 employees) (Texas A&M University 2006). In 2004, Abilene MSA had a total personal income of over $4 billion, with an average per capita income of $26,432 according to the Bureau of Economic Analysis (2006).

Dyess AFB uses Suez Energy Resources as their regional energy provider, and American Electric Power (AEP) Texas for transmission and distribution of that power. In FY10, Dyess paid $3.1M to Suez and $0.8M to AEP for energy and energy delivery, respectively. Suez is the second-largest retail energy provider in the United States, including most of the northeast, with a total contracted load of over 7,000 MW. AEP Texas delivers electricity to more than 900,000 homes, businesses and industries in south and west Texas.

3.4.2 Transportation

Transportation analyses entail looking at existing roadways and the traffic on those roadways and comparing the number of vehicle trips due to the proposed action. An adverse impact would be such that enough vehicle trips would cause undue delays on the roadways.

Affected Environment

The affected area for transportation are the road networks affected by the proposed action, in this case, the roads potentially affected are those cited in the affected environment of this section.

The roadways which would be used for the proposed action are FM 3438 and Military Drive. FM 3438 is a state-maintained road and runs from South 1st Street (U.S. 80) to Buffalo Gap Road (U.S. 83) along the east boundary of Dyess AFB. Military Drive extends from FM 3438 to the Tye Gate along the north boundary of Dyess AFB. Traffic volume for FM 3438 is 7,700 vehicles per day at the northern portion, 16,700 in the central section, and 13,500 at the southern end of FM 3438 (TxDot 2004). Traffic counts on

Military Drive are not available at this time, but the road is not considered a main thoroughfare and traffic counts are expected to be low.

3.4.3 Utilities

Affected Environment

The affected environment for effects of utility use associated with the proposed action and alternatives includes Dyess AFB and the surrounding communities of Abilene and Tye.

Dyess AFB receives its potable and reclaimed water supply from the City of Abilene. The water supply is provided by the Abilene Water Department, which relies on surface water from Lake Abilene, Kirby Lake, Fort Phantom Lake, Lake Ivie, and Hubbard Creek Reservoir. The Abilene Water Department utilizes three water treatment plants, which have a combined maximum daily treatment capacity of 48.5 million gallons per day (Dyess 2004). These plants include the Abilene Water Treatment Plant, the Grimes Water Treatment Plant, and the Northeast Water Treatment Plant. The average daily water consumption for the City of Abilene water system in 2001 was approximately 21 million gallons per day, which is less than half of the system's maximum capacity (Dyess 2004). The maximum peak water usage during 2001 was approximately 35 million gallons per day, which is approximately 71 percent of the system's maximum capacity. The Abilene Water Department is currently building another treatment plant that will provide additional treatment capacity (Dyess 2004). The WTE plant operator would be required to purchase water and wastewater treatment services directly from the City of Abilene and not be connected to the water and wastewater systems serving Dyess AFB. During the winter months, up to 4 million gallons of treated effluent is pumped into Kirby Lake via the Kirby Lake Pumping Station. Water is allocated to fill six golf course ponds including the ponds on Dyess AFB. During the dry seaon, water for these ponds are provided using the Kirby Lake Pumping Station. Most of the water comes from the treatment facility, with any shortfall augmented by Kirby Lake water (personal communication Taylor, 2011).

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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 presents an assessment of the potential environmental consequences of the proposed action and alternatives and no-action alternative. To define the potential consequences, this chapter overlays the components of the proposed action alternatives described in Chapter 2 onto the affected environment described in Chapter 3. Each of the environmental resources described in Chapter 3 is affected to a different degree and has a different method of analysis. Cumulative effects of the proposed action and alternatives with other past, present, and foreseeable future actions are presented in Chapter 5. Irreversible and irretrievable effects are also discussed in Chapter 5.

4.2 PHYSICAL RESOURCES

4.2.1 Air Quality

4.2.1.1 Significance Criteria

Criteria used to determine the significance of increases in air emissions are based on federal, state, and local air pollutant standards and regulations. For the purposes of this analysis, 250 tons per year per criteria pollutant was used as a threshold to trigger further evaluation of potential air quality impacts. This particular threshold is used by the USEPA in the New Source Review standards as an indicator for impact analysis for listed new major stationary sources in attainment areas. In accordance with this standard, any major new stationary sources that exceed 250 tons per year for any listed pollutant must conduct further analysis to demonstrate that these impacts would not cause a significant degradation of air quality under the Prevention of Significant Deterioration (PSD) regulations. No similar regulatory threshold is available for mobile source emissions, which are the primary sources for the construction and transportation of the MW. Lacking any mobile source emissions thresholds, the 250-ton major stationary source was used to equitably assess mobile source emissions. Finally, the Mandatory GHG Reporting Rule (MRR) threshold of 25,000 metric tons per year of carbon dioxide equivalent (CO_2e) emissions was used to evaluate GHG emissions.

All of the alternatives would produce air emissions from temporary construction activities and permanent operational emissions of the municipal waste combustion unit.

4.2.1.2 Alternative 1- Gasification

Construction Activities

Construction emissions associated with the proposed action include fugitive dust (PM_{10}) from grading and combustion (primarily CO and NO_x, and smaller amounts of VOCs, SO_x, and PM_{10}) from heavy-duty diesel construction equipment exhaust. These estimations also assumed that grading activities would occur on 5.6 acres. Site controls would include soil stocking and watering to reduce fugitive dust. Exhaust emissions from heavy-duty diesel construction equipment were based on a mix of typical

construction equipment for the project. At this time, it is assumed that construction for any of the alternatives will result in similar building footprints. Therefore, construction estimates have been based on construction of a gasification unit, but are presumed to be essentially the same for all alternatives. Table 4-1 summarizes projected emissions during the construction phase; Appendix B provides more specific emission calculation data.

Table 4-1. Projected Pollutant Emissions During Construction of the WTE Facility

	Pollutants (Tons/Year)					
	CO	*VOCs*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Construction	0.75	0.28	2.14	0.24	7.18	0.83

WTE Plant Operations

The emissions generated by the combustion process would be associated with the actual emissions released out of the smokestack and the vehicular emissions from the waste management activities. The amount of MSW that would be processed at the plant ranges from of 45,625 to 91,250 tons of waste per year, depending on the combustion process used. The waste would first be sorted, with the waste suitable for fuel in the combustion unit sent to a hopper and the material not suitable such as cans, glass, etc packaged and sent to a recycling facility. For the purposes of this analysis, it is assumed that 20 percent of the incoming waste is segregated and recycled or otherwise disposed (Dyess WTE Air Permit Application, 2006). The remaining 80 percent is combusted for energy. This 80/20 ratio applies to all of the alternatives.

Texas Administrative Code and USEPA requirements limit the amount of emissions that this type of power plant can emit. Periodic monitoring, testing, and emissions controls would ensure the emissions do not exceed state and federal requirements.

All of the WTE plant alternatives, which include gasification, pyrolysis, plasma gasification/pyrolysis, and incineration, are regulated under the Clean Air Act Standards of Performance for New Stationary Sources. An up to 5.5 MW WTE plant specifically is classified as a Small Municipal Waste Combustor, the regulations for which are published in the Federal Code of Regulations Title 40, Part 60, Subpart AAAA.

The Dyess WTE facility would be classified as a Class II unit. These are small municipal waste combustion units that are located at municipal waste combustion plants with an aggregate plant combustion capacity less than or equal to 250 tons per day of municipal solid waste.

Emissions from the plant would be regulated by a permit issued by the TCEQ, and would include limits for 11 pollutants that fall into four groupings, as follows:

(a) *Organics:* Dioxins/furans.
(b) *Metals:*
    (1) Cadmium
    (2) Lead
    (3) Mercury

(4) Opacity

(5) Particulate matter

(c) *Acid gases:*

(1) Hydrogen chloride

(2) Nitrogen oxides

(3) Sulfur dioxide

(d) *Other:*

(1) Carbon monoxide

(2) Fugitive ash

Regardless of the final WTE plant design, compliance with the permit conditions will be mandatory. These permit conditions are established to ensure the combustion of MW for energy does not lead to the violation of any air quality standards or result in a significant impact on the local air quality.

A visible plume of steam may be emitted from the stack due to the moisture content of the MW and the possible introduction of moisture for some of the potential combustion methods being evaluated. Visible emissions from the facility will also be regulated to ensure opacity is not an issue.

Transportation

The number of truck trips to the facility would vary depending on the type of combustion process used, and range from 5,703 to 11,406 trips per year. Transportation emissions associated with each alternative are presented in Table 4-2.

Table 4-2. Projected Criteria Pollutant Emissions From Municipal Waste Transport and Total Operational GHG Emissions for All Alternatives

Combustion Method	*Total trips/yr*	*[1]VOCs T/yr*	*[1]CO T/yr*	*[1]NO_x T/yr*	*[1]SO_2 T/yr*	*[1]PM_{10} T/yr*	*[1]$PM_{2.5}$ T/yr*	*[2]CO_2e Mt/yr*
Gasification	7,129	0.05	0.17	0.72	0.00	0.02	≤ 0.02	52,619
Pyrolysis[3]	9,524	0.07	0.22	0.96	0.00	0.03	≤ 0.03	69,395
Plasma Gasification/ Pyrolysis[4]	5,703	0.04	0.13	0.58	0.00	0.02	≤ 0.02	42,633
Incineration[5]	11,406	0.08	0.26	1.15	0.00	0.04	≤ 0.04	82,576

Notes:

[1]Criteria pollutant emissions are based on truck transport of MW to Dyess and return (20 miles), only.

[2]Carbon dioxide equivalent represents emissions from transporting and combusting the MW, and from operation of five emergency generators for 420 hours per generator in a year.

[3]Alternative 2

[4]Alternative 3

[5]Alternative 4

Regional transportation emissions would actually decrease, since Dyess AFB is 7 miles closer than the regional landfill located on the northeast side of Abilene, and an average round trip was calculated as 20 miles. There would, however, be a shift in local emissions with more concentrated in the Dyess AFB area.

Criteria pollutant emissions are far below the threshold level of 250 tons per year. The CO_2e value for combustion of MSW ranges from nearly twice the limit that USEPA has established for permitting

requirements to more than three times the limit. Operation of the facility, therefore, will likely require a permit under the MRR.

Conclusion

Impacts to air quality associated with the construction activities under the proposed action would be short term. Total criteria pollutant emissions for the proposed action will be established by permit limits and conditions. These regulatory requirements would ensure that operation of the plant would not create a significant air quality impact in the region.

Under an agreement between Dyess AFB, the WTE plant operator, and TCEQ, permits associated with the proposed action would be obtained by the WTE plant operator. The WTE plant operator would be primarily responsible for all TCEQ compliance and enforcement activities associated with the permit.

The GHG emissions associated with combusting the MSW for energy would likely require that the facility obtain a permit under the MRR. While the facility may require permitting due to GHG emissions generated by the combustion of MSW, it should be noted that overall, the WTE facility would reduce GHG emissions in the region. This is due to the elimination of GHG emission from three different operations that would be replaced by the WTE facility:

1. For every megawatt of electricity generated through the combustion of solid waste, a megawatt of electricity from conventional, e.g., coal or oil-fired, power plants is avoided, creating a net savings of emissions of GHGs.
2. A modern municipal WTE facility separates ferrous and/or nonferrous metals for recycling. This is more energy efficient than mining virgin materials for the production of new metals such as steel. As a result, there is a significant energy savings and additional avoidance of GHG emissions.
3. When a ton of solid waste is delivered to a WTE facility, the methane that would have been generated if it were sent to a landfill is avoided. While some of this methane could be collected and used to generate electricity, some would not be captured and would be emitted to the atmosphere. Methane is 21 times more potent than carbon dioxide with regard to its Global Warming Potential.

4.2.1.3 Alternative 2 - Pyrolysis

Air Quality effects from a pyrolysis process would be similar to those presented for a gasification process for construction, WTE plant operation, and the conclusion. Transportation and GHG emissions would differ, however, and are reflected in Table 4.2 above. Transportation and GHG emissions would still remain below *de minimis* levels.

4.2.1.4 Alternative 3 - Plasma Gasification/Pyrolysis

Air Quality effects from a plasma gasification/pyrolysis process would be similar to those presented for a gasification process for construction, WTE plant operation, and the conclusion. Transportation and GHG

emissions would differ, however, and are reflected in Table 4.2 above. Transportation and GHG emissions would still remain below *de minimis* levels.

4.2.1.5 Alternative 4 - Incineration

Air Quality effects from an incineration process would be similar to those presented for a gasification process for construction, WTE plant operation, and the conclusion. Transportation and GHG emissions would differ, however, and are reflected in Table 4.2 above. Transportation and GHG emissions would still remain below *de minimis* levels.

4.2.1.6 No-Action Alternative

Under the no-action alternative, the Air Force would not implement the WTE plant. Baseline emissions would remain unchanged and Dyess AFB would continue to operate under 30 TAC 122.122.

4.2.2 Hazardous Materials and Hazardous Waste

4.2.2.1 Significance Criteria

The significance of potential impacts associated with hazardous materials and hazardous wastes is based on the toxicity, transportation, storage, and disposal of these substances. Hazardous materials and hazardous waste impacts are considered significant if the storage, use, transportation, or disposal of these substances substantially increases the human health risk or environmental exposure. An increase in the quantity or toxicity of hazardous materials and/or hazardous waste handled by a facility may also signify a potentially significant impact, especially if a facility was not equipped to handle the new waste streams.

Hazardous materials and hazardous waste are very highly regulated and rarely reach the threshold of significance because of the manner in which they are regulated. There are some exceptions, such as highly toxic or reactive gases or liquids stored or used in large quantities, but for the proposed action this would not be the case. As a proposal increases their use of hazardous materials and operation which dictates the type of waste that occurs can breach thresholds of regulatory requirements. For example, wastes generated by industrial processes are regulated differently that those which produce MSW. The requirements can have a significant impact of the operation of a facility in terms of how waste is reported, classified and disposed; normally the procedures developed in response sufficient provide safeguards to prevent significant releases to the environment. So while having an impact on operations, the classification often would not necessarily impact the environment.

4.2.2.2 Alternative 1 - Gasification

Waste delivered to the WTE plant and sorted and generated by the combustion unit would be under control of the contractor operating the plant. The Dyess AFB IWMP would be adhered to, but waste streams of the WTE plant would be characterized, manifested, and disposed independently of the waste streams generated on the base proper.

The expected wastes would be glass, metals, household hazardous waste, and the combustion ash. The glass, metals, and household hazardous waste, primarily batteries, would be generated from the sorting

process. Glass and metals would be picked up and delivered to be recycled. Household hazardous waste would be returned to the generator (City of Abilene, City of Tye, or Dyess AFB) for disposition. The combustion process in the first stage of the gasification process would produce combustion ash. The ash is not expected to be hazardous waste, but could contain elevated levels of metals from items not sorted prior to combustion. The ash would be tested using standard hazardous waste testing protocols; Toxicity Characteristic Leaching Procedure (TCLP) would be used, to verify whether the ash was hazardous or non-hazardous. Depending on the TCLP results, the ash would be sent to the appropriate disposal facility. If hazardous, the processing of the ash would include use of proper storage containers, labels, and secondary containment as well as the applicable manifesting and requirements for shipping. The disposal site would be also be licensed and permitted to accept this type of waste. Table 4-3 lists the expected wastes and quantities from the gasification process.

Table 4-3. Estimate of Wastes[1] Produced by Gasification (tpy)

Combustion Ash	6,000
Preprocessed Solid Waste (dirt, glass, kitty litter, etc)	1,000
Preprocessed Liquid Waste	2,000
Post-Process Liquid Waste	3,000
Aluminum and Metals	2,000
Household Hazardous Waste	20

Note:
[1]Amount of waste based on tons of MSW input per Table 2-1.

Other waste that could be generated from the proposed action would be construction debris during construction, and wastes generated from maintenance activities of the WTE plant. Construction debris would normally be disposed in accordance with standard construction practices and as required by the Dyess AFB IWMP. Maintenance activities would generate small amounts of waste, typically oily rags, adhesives, coolant, etc.; however, the wastes are expected to be in very low quantities. TCEQ has determined the waste generated by the WTE plant would not reclassify Dyess AFB as an industrial waste generator; the base would retain its status as a non-industrial generator. The letter is attached as Appendix C to this document. Again, all waste would be handled in accordance with the Dyess AFB IWMP.

An optional closed loop propane heat recovery system would utilize the waste heat to operate a turbine generator. The system would not burn the propane, but rather uses it as the working fluid in the turbine. The closed-loop propane system would be circulated through a cooling tower as part of the continuous loop. Approximately 7,000 gallons of propane would be stored on site for the closed-loop propane system. The tank would be a standard 10,000 gallon tank about the size of a large propane delivery truck. The base's hazardous material inventory would be updated to include the propane.

Environmental Restoration Program

The proposed project would be located approximately ¼ mile from the nearest ERP site; therefore, no impacts would be expected from implementing Alternative 1.

4.2.2.3 Alternative 2 - Pyrolysis

Wastes produced by a pyrolysis process would be similar to those produced from gasification with the exception of biochar instead of combustion ash. Biochar waste is not expected to be hazardous, but would be tested using TCLP. Depending on the TCLP results, the biochar would be sent to the appropriate disposal facility; or if hazardous, the processing of the biochar would include use of proper storage containers, labels, and secondary containment as well as the applicable manifesting and requirements for shipping. The disposal site would be also be licensed and permitted to accept this type of waste. Table 4-4 lists the expected wastes and quantities from the pyrolysis process.

Table 4-4. Estimate of Wastes[1] Produced by Pyrolysis (tpy)

Biochar	8,000
Preprocessed Solid Waste (dirt, glass, kitty litter, etc)	1,300
Preprocessed Liquid Waste	2,700
Post-Process Liquid Waste	4,000
Aluminum and Metals	2,700
Household Hazardous Waste	27

[1]Amount of waste based on tons of MSW input per Table 2-1.
[2]The cooling tower water would be considered waste water to the POTW, but is essentially recycled water received from the POTW.

Environmental Restoration Program

The proposed project would be located approximately ¼ mile from the nearest ERP site; therefore, no impacts would be expected from implementing Alternative 2.

4.2.2.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Wastes produced by a plasma gasification/pyrolysis process would be similar to those produced from gasification with the exception of glass slag instead of combustion ash. The vitrified glass or slag is not expected to be hazardous, but would be tested using TCLP. Depending on the TCLP results, the slag would be sent to the appropriate disposal facility; or if hazardous, the processing of the glass slag would include use of proper storage containers, labels, and secondary containment as well as the applicable manifesting and requirements for shipping. The disposal site would be also be licensed and permitted to accept this type of waste. Table 4-5 lists the expected wastes and quantities from the plasma gasification/pyrolysis process.

Table 4-5. Estimate of Wastes[1] Produced by Plasma Gasification/Pyrolysis (tpy)

Glass slag	4,800
Preprocessed Solid Waste (dirt, glass, kitty litter, etc)	800
Preprocessed Liquid Waste	1,600
Post-Process Liquid Waste	2,400
Aluminum and Metals	1,600
Household Hazardous Waste	16

Note:
[1]Amount of waste based on tons of MSW input per Table 2-1.

Environmental Restoration Program

The proposed project would be located approximately ¼ mile from the nearest ERP site; therefore, no impacts would be expected from implementing Alternative 3.

4.2.2.5 Alternative 4 - Incineration

Wastes produced by an incineration process would be similar to those produced from gasification. The combustion ash is not expected to be hazardous, but would be tested using TCLP. Depending on the TCLP results, the ash would be sent to the appropriate disposal facility; or if hazardous, the processing of the ash would include use of proper storage containers, labels, and secondary containment as well as the applicable manifesting and requirements for shipping. The disposal site would be also be licensed and permitted to accept this type of waste. Table 4-6 lists the expected wastes and quantities from the incineration process.

Table 4-6. Estimate of Wastes[1] Produced by Incineration (tpy)

Combustion Ash	9,600
Preprocessed Solid Waste (dirt, glass, kitty litter, etc)	1,600
Preprocessed Liquid Waste	3,200
Post-Process Liquid Waste	4,800
Aluminum and Metals	3,200
Household Hazardous Waste	32

Note:
[1]Amount of waste based on tons of MSW input per Table 2-1.

Environmental Restoration Program

The proposed project would be located approximately ¼ mile from the nearest ERP site; therefore, no impacts would be expected from implementing Alternative 4.

4.2.2.6 No-Action Alternative

Under the no-action alternative, the Dyess AFB WTE plant project would not occur. Existing procedures for the management, procurement, handling, storage, and disposal of hazardous materials used on Dyess AFB would remain unchanged. The status of Dyess AFB ERP sites would remain unchanged under baseline conditions.

4.2.3 Soils and Stormwater

4.2.3.1 Significance Criteria

Soil resources are not regulated to any detail so significance criteria are based on the nature, degree, and duration of impacts to those resources. Loss of substantial quantities of soils, or degradation of the quality of soils used for agriculture or similar functions would potentially result in significant impacts. Moreover, creation of quantities of fugitive dust during construction requires analysis. In terms of water resources, significant impacts may result from erosion and sedimentation into surface water bodies and degradation of their function and values.

4.2.3.2 Alternative 1 - Gasification

Under Alternative 1 for the proposed WTE plant construction, impacts to soils would be negligible. The area is not located on any seismic faults, has little erosional characteristics, and would not suffer from expansive soils (Dyess AFB 2006b). The siting location for the new WTE plant would not require a change in the existing grade. The construction site is a flat, partially disturbed portion of the base. Erosion during construction and subsequent sedimentation in down-gradient drainages could have an impact in the immediate area; however, erosion control and sediment retention measures and silt fencing would minimize erosion and prevent adverse effects to drainages. Sedimentation into any water resources would be negligible with proper application of these control measures. The TCEQ General Stormwater Permit covers all stormwater discharges. During project design, a site specific stormwater permit and a Stormwater Pollution Prevention Plan would be developed and obtained prior to construction. In addition, all requirements of EISA §438 for stormwater management would be complied with during the design and operation of the WTE plant. If necessary, adequately sized retention basins would be installed to contain stormwater runoff on the site.

The area of the proposed construction is not located in a floodplain; therefore, potential impacts to surface waters would be negligible.

4.2.3.3 Alternative 2 - Pyrolysis

Impacts to soils and stormwater produced by a pyrolysis process would be similar to those produced from gasification because the WTE plant location and construction impacts are the same.

4.2.3.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Impacts to soils and stormwater produced by a plasma gasification/pyrolysis process would be similar to those produced from gasification because the WTE plant location and construction impacts are the same.

4.2.3.5 Alternative 4 - Incineration

Impacts to soils and stormwater produced by an incineration process would be similar to those produced from gasification because the WTE plant location and construction impacts are the same.

4.2.3.6 No-Action Alternative

There would be no change to the current conditions of soils and stormwater resources on Dyess AFB with implementation of the no-action alternative. Existing conditions as described under the affected environment would remain unchanged.

4.3 BIOLOGICAL RESOURCES

4.3.1 Vegetation, Wildlife, Wetlands, and Special-Status Species

4.3.1.1 Significance Criteria

Determination of the significance of potential impacts to biological resources is based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the

proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration of ecological ramifications. Analysis of potential on-base impacts focuses on whether and how ground-disturbing activities and changes in the noise environment may affect biological resources.

4.3.1.2 Alternative 1 - Gasification

Under Alternative 1, approximately 5.6 acres of vegetation and habitat would be disturbed. The area is mesquite woodlands and previously disturbed to some degree; preconstruction surveys would minimize removal of native vegetation for access roads or electrical transmission lines, whilepost-construction revegetation and landscape plans would ensure use of native plants. Prior to any construction activity a survey by a qualified biologist would be performed to assess the presence of the Texas Horned Lizard and its habitat to include Harvester ant colonies which is the primary food source of the lizard. Construction activities will avoid disturbance of Harvester ant colonies. Additionally, in coordination with Texas Parks and Wildlife and pursuant to the 2006 INRMP, if the lizard is found or encountered appropriate responses will be implemented to protect the species which may include workarounds and/or relocation of the lizard to suitable habitat elsewhere on base. Therefore, proper adherence to the INRMP should result in insignificant impacts to the Texas horned lizard or its habitat. Additionally, a similar survey would be performed for any migratory birds actively nesting in the project area prior to construction; USFWS would be contacted should any birds be found. Additionally, construction would be planned to occur outside the active nesting season, to the extent possible. No federally listed endangered or threatened bird species are likely to nest at Dyess AFB (Dyess AFB 2006b); as a result, there would be no effect from the proposed action on listed or sensitive species. No wetlands exist in the vicinity of the proposed action; therefore, no impact to these resources would occur. Additionally, aquatic habitats would not be affected due to evaporation loss of effluent earmarked for Kirby Lake (see section 4.4.3.2).

Alternative 1 byproducts and disposal requirements would be handled in accordance with all federal, state, and Air Force regulations to ensure safety and wellbeing for wildlife within the project area.

4.3.1.3 Alternative 2 - Pyrolysis

Impacts to biological resources produced by a pyrolysis process would be similar to those produced from gasification due to impacts from construction and operation of the WTE being the same.

4.3.1.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Impacts to biological resources produced by a plasma gasification/pyrolysis process would be similar to those produced from gasification due to impacts from construction and operation of the WTE being the same.

4.3.1.5 Alternative 4 - Incineration

Impacts to biological resources produced by an incineration process would be similar to those produced from gasification due to impacts from construction and operation of the WTE being the same.

4.3.1.6 No-Action Alternative

No changes to existing conditions of vegetation, wildlife, or special-status species would occur through implementation of the no-action alternative since construction activities would not occur related to the WTE plant project.

4.4 HUMAN RESOURCES

4.4.1 Socioeconomics

4.4.1.1 Significance Criteria

NEPA requires agencies to look at the socioeconomic impacts of their actions, but there is no threshold for when a socioeconomic impact becomes significant.

4.4.1.2 Alternative 1 - Gasification

Socioeconomic effects of Alternative 1 would occur primarily due to long-term energy savings for the base. The surrounding communities of Tye and Abilene should also see some benefit from the creation of jobs needed for the construction and operation of the WTE plant, as well as reduced landfill fees. The local landfill company, Republic Services, would also likely see a lower cost of waste handling and landfill maintenance. Construction activities would take about one year. Approximately 25 to 30 workers would be employed at any one time during construction. Workers would likely commute from the surrounding area to Dyess AFB on a short-term temporary basis. Local construction companies would most likely be contracted to build the WTE plant with the majority of the construction materials purchased outside the local region and transported to the site. Construction activities would result in minor, short-term beneficial impacts to the local economy and would easily be absorbed within the Abilene MSA. The operation of the WTE plant would result in the creation of seven new jobs initially; the number of workers could increase as operations continue.

The energy savings for the base would be realized over a 30 year payment stream versus the status quo. The WTE plant would not supply all the electrical energy required by Dyess AFB; some power would still need to be purchased from Suez, with distribution continuing from AEP. Initially, Dyess would pay approximately $0.15 million more for energy with operation of the WTE plant but costs would escalate at a slower rate and would not be subject to unbudgeted price spikes.

Savings for Dyess AFB would also be realized from reduced landfill costs and revenue generated from recycling. Transportation costs would be reduced since fewer trips to the municipal landfill would be required. Tipping fees are charged for each truck dumping at a landfill. Approximately $70,000 of tipping fees would be saved by Dyess AFB as a result of Alternative 1, nearly offsetting the small increase in power purchased with initial operation of the WTE plant.

4.4.1.3 Alternative 2 - Pyrolysis

Socioeconomic impacts from a pyrolysis process would be similar to those resulting from a gasification process; however, with more MSW required by pyrolysis, the savings in landfill fees would increase for Dyess AFB by approximately 34 percent or $93,500.

4.4.1.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Socioeconomic impacts associated with a plasma gasification/pyrolysis process would be similar to those resulting from a gasification process. The more efficient plasma process, however, would require less MSW than that required by gasification. Thus, the savings in landfill fees would be approximately 80 percent of the savings realized by a gasification process WTE plant, or $56,000.

4.4.1.5 Alternative 4 - Incineration

Alternative 4, an incineration process, would require the most MSW input, and would save 60 percent or $112,000 more than a gasification system on landfill fees for Dyess AFB. Other socioeconomic impacts would be similar to those resulting from a gasification process.

4.4.1.6 No-Action Alternative

Under the no-action alternative, no changes to regional socioeconomics would be expected as conditions would remain unchanged.

4.4.2 Transportation

4.4.2.1 Significance Criteria

Criteria for determining significance for transportation resources are whether the proposed action would create enough additional traffic such that the roads cannot meet the demands of the total traffic.

4.4.2.2 Alternative 1 - Gasification

Alternative 1 would result in additional trips along FM 3438 and Military Drive. There would be approximately 27 trips per week by trucks hauling MSW to the WTE plant and empty trucks would return along the same route. However, this would be offset by the reduction in truck traffic to the landfill. Similarly, road maintenance would incur the same effect—comparable amounts of heavy vehicles would travel the roads, but the particular roads themselves would shift from those near the landfill to those near the WTE plant. In addition, removal of wastes and recycled materials would require truck trips on an as needed basis. All this activity would result in a daily traffic increase of about 30 trips. Compared to the existing traffic, the contribution of Alternative 1 to traffic would be less than 0.38 percent of the traffic volume (TxDot 2004).

4.4.2.3 Alternative 2 - Pyrolysis

Transportation impacts associated with a pyrolysis process are similar to gasification, but would require a slight increase in MSW truck trips per week to 36. Impacts to FM 3438 and Military Drive would not be adverse with 0.49 percent of traffic volume TxDot 2004).

4.4.2.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Transportation impacts associated with a plasma gasification/pyrolysis process are similar to gasification, but would result in a slight decrease in MSW truck trips per week to 25. Impacts to FM 3438 and Military Drive would not be adverse with 0.35 percent of traffic volume (TxDot 2004).

4.4.2.5 Alternative 4 - Incineration

Transportation impacts associated with an incineration process are similar to gasification, but would require a slight increase in MSW truck trips per week to 44. Impacts to FM 3438 and Military Drive would not be adverse with 0.60 percent of traffic volume (TxDot 2004).

4.4.2.6 No-Action Alternative

No impacts to transportation resources would be expected through implementation of the no-action alternative.

4.4.3 Utilities

4.4.3.1 Significance Criteria

Significant impacts to utility water resources may result from wastewater caused by proposed activities that adds hazardous or toxic wastes above allowable regulatory thresholds associated with the CWA would be significant. Additionally, demand for water from the proposed action that exceeds available amounts would constitute a significant impact.

4.4.3.2 Alternative 1 - Gasification

Under Alternative 1, water required to operate the WTE plant would primarily be for use in the cooling tower to cool the closed-loop propane system which uses hot gas from the boiler. Propane would be used because it can easily be heated into gaseous phase and cooled back to liquid phase as it circulates through the system. The majority of the water use would be for cooling of the propane. Approximately 250 gallons per minute (gpm) of recycled water from the POTW would be required for the system. As the cooling water circulates through the system, about 100 gpm is returned to the POTW as wastewater and the remainder evaporates. Evaporation causes the dissolved solids and other impurities to concentrate in the cooling water. The higher concentration of these impurities can calcify and cause clogging in the system. As a result, cooling towers have to discharge water continually as the impurities concentrate. This water would be piped back to the POTW, treated, and re-discharged as wastewater. Water discharges from the WTE plant would be discharged to the City of Abilene wastewater treatment plant following City of Abilene Industrial Wastewater Ordinance protocols currently in place and would not affect water quality. The WTE plant would discharge approximately 100 gpm of water to the City of Abilene POTW and would comply with Industrial Wastewater Ordinance, Ordinance # 36-1992. The ordinance sets forth limits on Potential of Hydrogen, total suspended solids, chemical composition, oils, and number of other requirements. Additionally, a wastewater discharge permit would be required by the operator to discharge to the POTW. All of these requirements would be met and permitted by the WTE

operator prior to releasing water to the POTW. The amount of wastewater lost to evaporation would be about 150 gpm or 216,000 gallons per day. Using a conservation assumption that all of the water evaporated due to the proposed WTE plant operation would be taken directly from Kirby Lake, the water level would be reduced by 0.01 inches per day (216,000 gallons per day / 740 acres x 325,853 gallons per acre-foot / 12 inches per foot) and would be an imperceptible change.

4.4.3.3 Alternative 2 - Pyrolysis

Impacts to utilities produced by a pyrolysis process would be similar to those produced from gasification due to comparable operations of the WTE plant.

4.4.3.4 Alternative 3 - Plasma Gasification/ Pyrolysis

Impacts to utilities produced by a plasma gasification/pyrolysis process would be similar to those produced from gasification due to comparable operations of the WTE plant.

4.4.3.5 Alternative 4 - Incineration

Impacts to utilities produced by an incineration process would generally be similar to those produced from gasification due to comparable operations of the WTE plant. However, the incineration process does not utilize a propane cooling tower, and thus, wastewater use and discharge under Alternative 4 would be less than under the other alternatives.

4.4.3.6 No-Action Alternative

Under the No Action Alternative, Dyess AFB would continue to use and generate the same types of demand for utilities as are described under the affected environment and currently being managed. No change from existing impacts would occur.

CHAPTER 5

CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

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CHAPTER 5
CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 CUMULATIVE EFFECTS

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Assessing cumulative effects involves defining the scope of the other actions and their interrelationship with the proposed action and alternatives, if they overlap in space and time.

Cumulative effects are most likely to arise when a proposed action is related to other actions that occur in the same location or at a similar time. Actions geographically overlapping or close to the proposed action and alternatives would likely have more potential for a relationship than those farther away. Similarly, actions coinciding in time with the proposed action and alternatives would have a higher potential for cumulative effects.

To identify cumulative effects, three fundamental questions need to be addressed:

1. Does a relationship exist such that affected resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
2. If one or more of the affected resource areas of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
3. If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

5.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time in which the effects could occur. Public documents prepared by federal, state, and local government agencies were the primary sources of information for identifying reasonable foreseeable actions.

5.2.1 Past and Present Actions

In 2003, Dyess AFB approved the Dyess AFB General Plan, which identified areas on the base where existing missions could be expanded and where new missions could be located (Dyess AFB 2003). Various military construction and other projects are proposed and would require environmental analysis if undertaken. Examples of these projects include providing new housing, administration, operations, support facilities, and utility system upgrades.

As an energy conservation and security project, Dyess AFB constructed a new back-up generator facility and replaced water pump motors on base. Under this proposal, Dyess AFB : 1) constructed and operates a back-up power plant using up to five generators fueled by diesel or bio-diesel producing 11.25 MW, and 2) installed three upgraded/replacement water pump motors in the base's existing potable water distribution plant.

Environmental analyses indicated the back-up generator facility would have minor environmental impacts low enough to warrant a FONSI. The impacts associated with the back-up generators included air quality emissions, hazardous materials, soils and water, biological resources, and socioeconomics. When combined with this proposal, soils and water and biological resources impacts would be associated with ground disturbing activities totaling 9.2 acres. The retention basin associated with the back-up generator project would be sufficiently to handle all of the runoff for the entire site. The Texas horned lizard was surveyed and would also be surveyed and relocated for the current WTE proposal; the site is not considered critical habitat for the lizard. Hazardous materials associated with the back-up generator project included storage of up to 40,000 gallons of diesel fuel in two 20,000 gallon tanks. The cumulative socioeconomics impacts of the two projects is considered a beneficial impact.

Cumulative air quality emissions would include emissions from both the back-up generator systems and the WTE plant itself. These emissions are regulated by TCEQ, and emission limits would be imposed by permit. As a Class II[1] small municipal waste combustion facility, the WTE plant is not expected to exceed the 250 ton per day PSD limits for major stationary sources.

In addition to criteria pollutants, the total lifecycle GHG emissions for each alternative are presented in Table 5-1 and are an estimate of GHG emissions over 30 years, which is the assumed minimum lifespan of the WTE facility. Dyess AFB would purchase heat and electricity from the plant, which would be owned and operated by another entity. However, the plant will be located on base property and would be constructed exclusively for the base. Therefore, it is appropriate to look at the GHG emissions as Scope 1 emissions from a stationary source as opposed to Scope 2 emissions from purchased heat and electricity.

Table 5-1. Lifecycle (30-year) CO_2e Emissions for Each Alternative

Alternative	*Lifetime CO_2e in metric tons*
Alternative 1 – Gasification	1,578,556
Alternative 2 – Pyrolysis	2,081,846
Alternative 3 – Plasma Gasification/Pyrolysis	1,278,979
Alternative 4 – Incineration	2,477,288

The emissions associated with the no action alternative would be required in order to thoroughly assess the cumulative impact of the GHG emissions from the proposed WTE facility. To obtain this information would require estimating GHG emissions associated with the landfill currently in use, as well as all other aspects of current solid waste operations for Dyess AFB and the surrounding area that would be included in the WTE scenario. Although this calculation is beyond the scope of the EA and the data are not readily available, it is sufficient to note that the WTE will be reducing GHG emissions overall regionally,

[1] A Class II unit is defined as small municipal waste combustion unit located at a municipal waste combustion plant with an aggregate plant combustion capacity less than or equal to 250 tons per day of municipal solid waste.

as indicated in Section 3 due to the elimination of waste to landfill, reduction in the use of conventionally-fired power plants, and the recycling of ferrous and nonferrous metals.

Implementation of these projects would ensure greater energy self-sufficiency and security, and reduce energy costs. Utilizing back-up generators also provides Dyess AFB with a reliable on-base source of electrical energy.

The potential for significant cumulative impacts of the proposed action and future base actions are not anticipated. Implementation of the renewable energy security and conservation management strategies, when combined with any future construction, operations, or utilities upgrade would not introduce an adverse impact in this already disturbed area of the base.

5.2.2 Reasonably Foreseeable Actions

No actions were identified at the federal, state, county level, or at Dyess AFB, that when combined with the renewable energy and security project evaluated in this EA would result in any cumulative effects. Therefore, there would be no cumulative impacts would occur from past and/or present actions.

5.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitment of resources which would be involved in the proposed action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural resource).

Implementation of the Dyess AFB WTE and MSW handling facility project would not result in an irreversible or irretrievable commitment of resources. Vehicles used in transport activities would consume fuel, oil, and lubricants; however, the amount of these materials used would not exceed that currently used. Wildlife depredation would not result in species decimation or affect species populations throughout the region. Prior to removal or depredation of a native wildlife species, migratory birds, or special-status species, Dyess AFB would obtain a permit from the USFWS.

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REFERENCES CITED

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REFERENCES CITED

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING CORRESPONDENCE AND PUBLIC NOTIFICATION

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DEPARTMENT OF THE AIR FORCE
7TH CIVIL ENGINEER SQUADRON (ACC)
710 3RD STREET
DYESS AIR FORCE BASE TEXAS 79607-1670

MEMORANDUM FOR Dr Alfredo Armendariz
Regional Adminstrator
U.S. EPA Region VI
1445 Ross Avenue
Dallas, TX 75202

FROM: 7 CES/ CEAN
710 Third Street
Dyess AFB TX 79607

SUBJECT: Waste to Energy Plant Environmental Assessment, Dyess Air Force Base, TX

1. Dyess Air Force Base (AFB) is in the process of preparing an Environmental Assessment (EA) for a proposal to have a waste-to-energy (WTE) plant built and operated on Dyess AFB property. The base plans to purchase power from the successful bidder of a WTE plant solicitation. Under the proposed action, Dyess AFB would agree to purchase approximately 5.5 megawatts (MW) of power from the WTE plant. The WTE plant operator would be responsible for all infrastructure and operational inputs for the plant from public sources. The energy provider would be required by the solicitation to build a WTE plant based on one of the following proven technologies: 1) gasification; 2) pyrolysis; 3) incineration, or 4) plasma. The method of producing electricity is flexible and up to the selected provider, as long as it is one of the four processes analyzed in the EA. The plant would be segregated from the base proper and be sited next to the generator system on Military Drive. The attached map provides the location of the approximate site for the WTE plant construction and operation.

2. The exact design of the WTE is unknown at this time; however, the EA is being prepared to set the environmental impact boundaries and limits which the WTE plant operator must remain within when choosing the method of energy production. The EA will analyze impacts resulting from implementation of the proposed action while examining the potential for cumulative impacts when combined with past, present, and any future proposals.

3. As part of the environmental analysis, Dyess AFB or its contractor, TEC Inc., may contact you during data collection efforts. In advance, we thank you for your assistance in this activity. If you have any specific questions relative to the proposal, we would like to hear from you. Please contact me at (325) 696-5664.

David E. Laurence

DAVID E. LAURENCE, P.G.
Chief of Environmental

Attachment
Map of Dyess AFB

Dyess AFB WTE Project IICEP Distribution List

Dr Alfredo Armendariz
Regional Adminstrator
U.S. EPA Region VI
Dallas, TX

Carter Smith
Executive Director
Texas Parks and Wildlife
Austin, TX

Winona Henry
Regional Director
Texas Commission on Environmental Quality
Abilene, TX

Celeste Brancel
Environmental Review Coordinator
Texas Parks and Wildlife Department
Austin, TX

Mayor Norm Archibald
Abilene, TX

Abilene City Council Members
Abilene, TX

Tye City Council Members
Tye, TX

USF&WS
Ecological Services Field Office
711 Stadium Drive, Suite 252
Arlington TX 76011
Attn: Tom Cloud, Field Supervisor

Texas Historic Commission
P.O. Box 12276
Austin, TX 78711-2276
Attn: F. Lawrence Oaks, SHPO

Budget Planning and Policy Office
1100 San Jacinto
Austin, TX 78701
Attn: Wendy Wyman, Env. Policy Dir.

Troy Fraser
State Senator
District 24
Austin, TX

Robert L. Duncan
State Senator
District 28
Lubbock, TX

Susan King
State Representative
District 71
Abilene, TX

Joe Heflin (likely to change 2 Nov)
State Representative
District 85
Hale Center, TX

The Honorable John Cornyn
Washington DC

The Honorable Kay Bailey Hutchison
Washington DC

The Honorable William Thornberry
Washington DC

The Honorable Randy Neugebauer
Washington DC

Austin FO

DEPARTMENT OF THE AIR FORCE

7TH CIVIL ENGINEER SQUADRON (ACC)
710 3RD STREET
DYESS AIR FORCE BASE TEXAS 79607-1670

EWTS
ES
ES
EL

MEMORANDUM FOR USF&WS
Ecological Services Field Office
711 Stadium Drive, Suite 252
Arlington TX 76011
Attn: Tom Cloud, Field Supervisor

FROM: 7 CES/ CEAN
710 Third Street
Dyess AFB TX 79607

SUBJECT: Waste to Energy Plant Environmental Assessment, Dyess Air Force Base, TX

1. Dyess Air Force Base (AFB) is in the process of preparing an Environmental Assessment (EA) for a proposal to have a waste-to-energy (WTE) plant built and operated on Dyess AFB property. The base plans to purchase power from the successful bidder of a WTE plant solicitation. Under the proposed action, Dyess AFB would agree to purchase approximately 5.5 megawatts (MW) of power from the WTE plant. The WTE plant operator would be responsible for all infrastructure and operational inputs for the plant from public sources. The energy provider would be required by the solicitation to build a WTE plant based on one of the following proven technologies: 1) gasification; 2) pyrolysis; 3) incineration, or 4) plasma. The method of producing electricity is flexible and up to the selected provider, as long as it is one of the four processes analyzed in the EA. The plant would be segregated from the base proper and be sited next to the generator system on Military Drive. The attached map provides the location of the approximate site for the WTE plant construction and operation.

2. The exact design of the WTE is unknown at this time; however, the EA is being prepared to set the environmental impact boundaries and limits which the WTE plant operator must remain within when choosing the method of energy production. The EA will analyze impacts resulting from implementation of the proposed action while examining the potential for cumulative impacts when combined with past, present, and any future proposals.

3. As part of the environmental analysis, Dyess AFB or its contractor, TEC Inc., may contact you during data collection efforts. In advance, we thank you for your assistance in this activity. If you have any specific questions relative to the proposal, we would like to hear from you. Please contact me at (325) 696-5664.

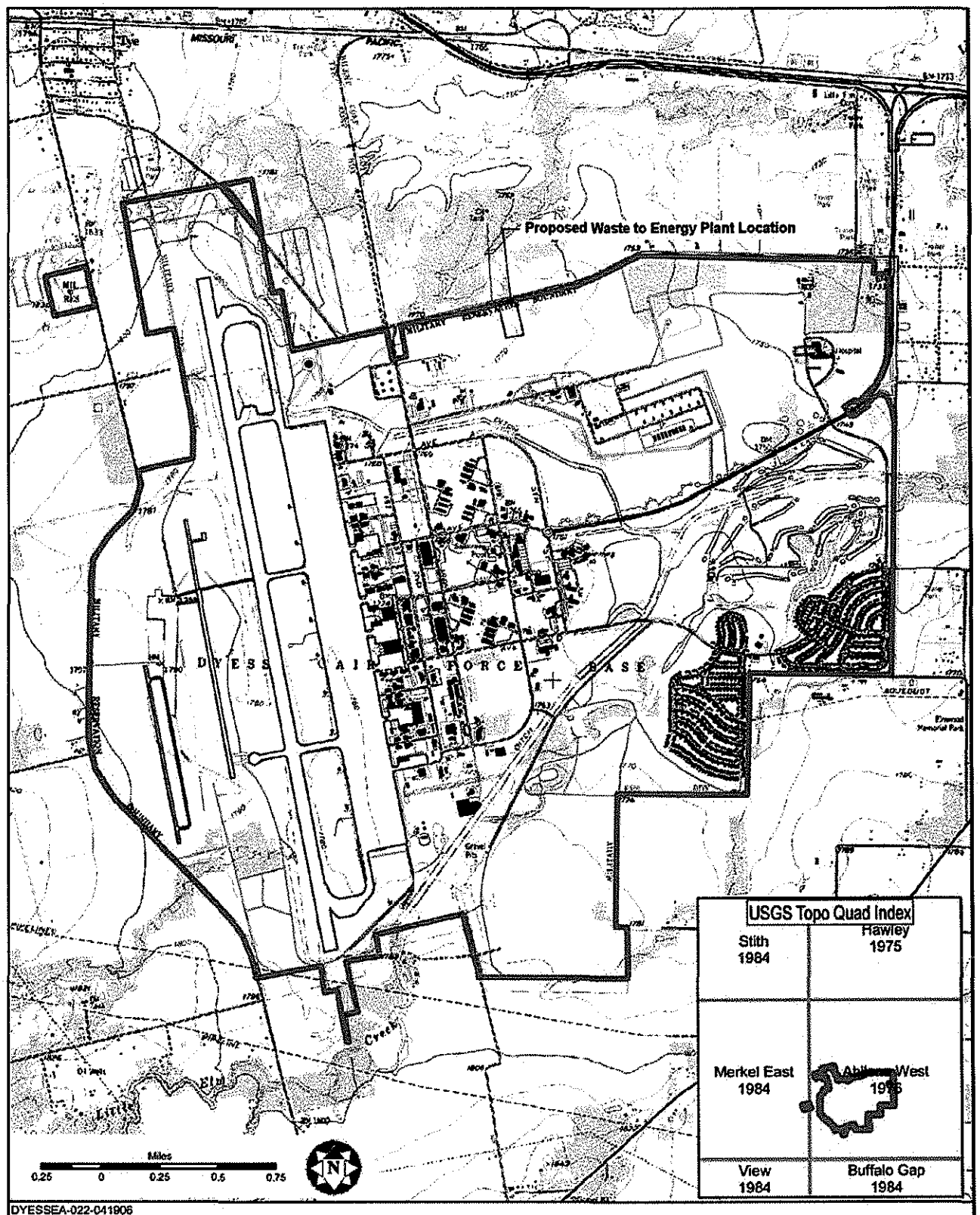
David E. Laurence

DAVID E. LAURENCE, P.G.
Chief of Environmental

Attachment
Map of Dyess AFB

NO ACTION
Date: 1-4-11
Consultation #: 21450-2011-I-0070
Approved by Linda Roberts
FOR Adam Zerrenner, Field Supervisor
U.S. FISH & WILDLIFE SERVICE, AUSTIN, TEXAS

Global Power For America



Proposed WTE Project Location

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

January 6, 2011

David E. Laurence, P.G.
Department of the Air Force
7th Civil Engineer Squadron (ACC)
710 3rd Street
Dyess Air Force Base, TX 79607-1670

SUBJECT: Waste-to-Energy Plant Environmental Assessment, Dyess Air Force Base, TX

Dear Mr. Laurence:

The Environmental Protection Agency (EPA) Region 6 has received your correspondence, dated December 10, 2010, regarding scoping for the Waste-to-Energy Plant Environmental Assessment (EA) on Dyess Air Force Base, TX. In accordance with the National Environmental Policy Act, and under Section 309 of the Clean Air Act, our agency has determined that no comments are necessary.

Please note that the proposed project may be subject to other federal, state, and local regulations. Please see attached documentation. Thank you for your coordination and don't hesitate to contact John MacFarlane, of my staff, at 214-665-7491 or macfarlane.john@epa.gov should you have any questions or concerns regarding this letter.

Sincerely,

Rhonda Smith
Chief, Office of Planning and
Coordination

Enclosure

NEPAssist

http://r6gis1.r06.epa.gov/NEPAVE/analysis_gisst.aspx
Last updated on Wednesday, January [illegible]
Topo Map (from TerraServer)

You are here: EPA Home NEPAssist Home

Map

Area of digitized polygon	0.02 sq mi

Facility

Within 100 meters of a hospital?	no
Within 1000 meters of a hospital?	no
Within 100 meters of a TRI facility?	no
Within 1000 meters of a TRI facility?	no
Within 100 meters of a regulated facility?	no
Within 1000 meters of a regulated facility?	no
Within 100 meters of an airport?	no

Water

Within 100 meters of a Wild and Scenic River?	no
Within an area over a Sole Source Aquifer?	no
Within the 100 year flood plain?	no
Within the 500 year flood plain?	no
Within 400 meters of an NWI wetland?	no
Within an NLCD wetland?	no
Within 1000 meters of an NLCD wetland?	no

Ecology

Within a federal/state park or wildlife area?	no
Within 1000 meters of a federal/state park or wildlife area?	no

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Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

June 29, 2011

Mr. David E. Laurence
7 CES/CEAN
710 Third Street
Dyess AFB, TX 79607

RE: Proposed Waste-to-Energy Plant at Dyess Air Force Base, Draft Environmental Assessment, Taylor County

Dear Mr. Laurence:

Texas Parks and Wildlife Department (TPWD) received the Draft Environmental Assessment (EA) regarding a proposed Waste-to-Energy (WTE) plant and associated Municipal Solid Waste (MSW) handling facility on land leased from Dyess Air Force Base (AFB). TPWD staff has reviewed the draft EA and offers the following comments and recommendations concerning this project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency on or after September 1, 2009 may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number 16198 in any return correspondence regarding this project.

Project Description

The U.S. Air Force proposes to solicit bids for a private entity to construct, own, and operate a WTE plant and associated MSW handling facility on land leased from the Air Force at Dyess AFB. Dyess would then agree to purchase up to 5.5 megawatts of power from the plant. Four alternative technologies are being considered for the proposed WTE plant including gasification, pyrolysis, plasma gasification/pyrolysis, and incineration. All alternatives would use MSW (which may include agricultural crop, wood, and animal waste as well as municipal waste) as inputs for the process. It is anticipated that the cities of Abilene and Tye would supply MSW to the WTE plant, although the plant operator would not be required to use local wastes. Any of the alternatives would be co-located

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AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

with existing back-up generators on Dyess AFB on Military Drive. Electrical transmission lines already exist on this site.

The WTE plant operator would be responsible for meeting all operating requirements including water and waste-water, electricity, and MSW for the plant from public sources, as well as producing a supplemental EA for impacts of acquiring these infrastructure resources. The exact design of the WTE plant is unknown at this time, but the EA was prepared to set the environmental impact boundaries and limits within which the WTE plant operator must remain when choosing the method of energy production. After completion of the environmental impact analysis process, the Air Force proposes to issue a request for proposal to bid on construction and operation of the WTE plant. The winning bidder would be required to design the facility using one of the four alternative methods analyzed in the EA. Any design that falls outside the parameters analyzed would require additional environmental analysis.

Previous Coordination

Section 2.4 of the EA states that Chapter 6 provides a list of people and agencies contacted, and Appendix A provides copies of that correspondence. TPWD provided preliminary information on this project on August 30, 2006, and February 16, 2011. Copies of that correspondence, which were not included in Appendix A, are attached for your reference.

Recommendation: Please review the attached comments and recommendations, as they remain applicable to the project as proposed.

State Law

Section 68.015 Parks and Wildlife Code

Section 68.015 of the Parks and Wildlife Code regulates state-listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. A copy of TPWD's *Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, is attached for your reference. State-listed species may only be handled by persons with a scientific collection permit obtained through TPWD.

Section 3.3.1 of the EA states that the state-listed threatened Texas horned lizard (*Phrynosoma cornutum*) is known to occur at Dyess AFB and has been observed and photographed by base personnel within a few hundred feet of the proposed site. Section 4.3.1.2 of the EA states that prior to any construction activity a qualified biologist will survey the area to assess the presence of the Texas horned lizard and its primary food source, the Harvester ant (*Pogonomyrmex* sp.). Construction would avoid disturbing Harvester ant colonies and measures such as workarounds or relocation would be implemented if individual Texas horned lizards are encountered in the project area. Post-construction revegetation and landscape plans would ensure the use of native plants.

Recommendation: TPWD supports the measures described in the EA to minimize impacts to the Texas horned lizard. If relocation of this species is required, please contact the TPWD Wildlife Permits Office at (512) 389-4647 for more information on obtaining a scientific collection permit.

Water Resources

With all of the technologies except incineration, the combustor produces a synthetic gas that can be used to generate power. The synthetic gas is further combusted to run a gas turbine and the residual heat can run a steam turbine. The flue gas from an incineration plant is not combustible and only a steam turbine would be operated. The combustion facility would also include cooling towers. Cooling water in the cooling towers would likely be supplied from the City of Abilene's Publicly Owned Treatment Works (POTW) reclaimed water stream but the energy provider would need to secure permission and infrastructure. Section 4.4.3.2 through 4.4.3.4 of the EA state that the gasification, pyrolysis, and plasma gasification/pyrolysis alternatives would require approximately 250 gallons per minute of recycled water from the POTW. As the cooling water circulates through the system, about 100 gallons per minute would be returned to the Abilene POTW as wastewater and the remaining 150 gallons per minute would evaporate. The incineration alternative would not require a cooling tower and wastewater use and discharge would be less than under other alternatives.

Section 3.4.3 states that Dyess AFB receives its potable and reclaimed water supply from the City of Abilene. The Abilene Water Department relies on surface water from Lake Abilene, Kirby Lake, Fort Phantom Lake, Lake Ivie, and Hubbard Creek Reservoir. The draft EA does not describe the current

use of the recycled water that is proposed to be used in steam turbines and cooling towers. The WTE plant operator would be required to purchase water and wastewater treatment services directly from the City of Abilene and would not be connected to the water and wastewater systems serving Dyess AFB.

Recommendation: TPWD recommends the final EA or the supplemental EA developed by the plant operator fully discuss the proposed source of the process water, the availability of water from the proposed source, the potential impacts of losing 150 gallons of water per minute (216,000 gallons per day) to evaporation in this arid area, and the type of cooling technology and structure to be used. TPWD recommends Dyess AFB and/or the plant operator assess the potential for adverse impacts to aquatic natural resources from the increased water use and seek to minimize those impacts.

I appreciate the opportunity to provide comments and recommendations on this draft EA. Please call me at (512) 389-4579 if we may be of further assistance.

Sincerely,

Julie C. Wicker

Julie C. Wicker
Wildlife Habitat Assessment Program
Wildlife Division

JCW:gg.16198

Attachments (3)

Protection of State-Listed Species
Texas Parks and Wildlife Department Guidelines

Protection of State-Listed Species

State law prohibits any take (incidental or otherwise) of state-listed species. State-listed species may only be handled by persons possessing a **Scientific Collecting Permit** or a **Letter of Authorization** issued to relocate a species.

- **Section 68.002 of the Texas Parks and Wildlife (TPW) Code** states that species of fish or wildlife indigenous to Texas are endangered if listed on the United States List of Endangered Native Fish and Wildlife or the list of fish or wildlife threatened with statewide extinction as filed by the director of Texas Park and Wildlife Department. Species listed as Endangered or Threatened by the Endangered Species Act are protected by both Federal and State Law. The State of Texas also lists and protects additional species considered to be threatened with extinction within Texas.

- **Animals -** Laws and regulations pertaining to state-listed endangered or threatened animal species are contained in **Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code** and **Sections 65.171 - 65.176 of Title 31 of the Texas Administrative Code (TAC).** State-listed animals may be found at **31 TAC §65.175 & 176**.

- **Plants -** Laws and regulations pertaining to endangered or threatened plant species are contained in **Chapter 88 of the TPW Code and Sections 69.01 - 69.9 of the TAC**. State-listed plants may be found at **31 TAC §69.8(a) & (b).**

Prohibitions on Take of State Listed Species

Section 68.015 of the TPW Code states that no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill, endangered fish or wildlife.

Section 65.171 of the Texas Administrative Code states that except as otherwise provided in this subchapter or **Parks and Wildlife Code, Chapters 67 or 68**, no person may take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered or threatened.

"Take" is defined in **Section 1.101(5) of the Texas Parks and Wildlife Code** as:

> *"Take," except as otherwise provided by this code, means collect, hook, hunt, net, shoot, or snare, by any means or device, and includes an attempt to take or to pursue in order to take.*

Penalties

The penalties for take of state-listed species (**TPW Code, Chapter 67 or 68**) are:

- 1ST Offense = Class C Misdemeanor:
  $25-$500 fine

- One or more prior convictions = Class B Misdemeanor
  $200-$2,000 fine and/or up to 180 days in jail.

- Two or more prior convictions = Class A Misdemeanor
  $500-$4,000 fine and/or up to 1 year in jail.

Restitution values apply and vary by species. Specific values and a list of species may be obtained from the TPWD Wildlife Habitat Assessment Program.

August 30, 2006

Teresa A. Clouse
7 CES/CEV
710 Third Street
Dyess AFB, TX 79607

RE: Proposed Energy Security and Conservation Projects at Dyess Air Force Base (AFB), Taylor County

Dear Ms. Clouse:

Thank you for coordinating with this agency in the planning activities regarding the proposed improvements within Dyess AFB in the City of Abilene. Texas Parks and Wildlife Department (TPWD) staff has reviewed the proposed project and offer the following comments.

The proposed project would entail the construction of a 5.4 megawatt waste to energy (WTE) plant, a backup power plant, a thermal storage plant, and the installation of replacement water pump motors. The proposed WTE plant and backup generators would be constructed on approximately 6 acres located adjacent to Military Road on the northern boundary of the installation. All other projects mentioned above would occur within the interior of the base.

Although the preliminary request for information did not give a description of the environment at the proposed WTE construction site, based on 2005 aerial photography and according to the Integrated Natural Resources Management Plan (INRMP) for Dyess AFB, the proposed project area contains Mesquite (*Prosopis glandulosa*) woodland. TPWD recommends minimizing the removal of native vegetation as much as feasible during construction of the WTE and any associated access roads or storage areas. This vegetation provides valuable habitat for native wildlife species in the area. If suitable habitat is present, potential impacts to the state listed threatened Texas horned lizard (*Phrynosoma cornutum*) could occur as a result of the disturbance to the mesquite community. TPWD recommends avoiding disturbance to the Texas horned lizard and any colonies of its primary food source, the Harvester ant (*Pogonomyrmex barbatus*), during clearing and construction. TPWD recommends the use of native plants in any revegetation or landscaping plans associated with the construction of the WTE. Attached is a list of plants native to the area that provide benefits for wildlife and erosion control. Also

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800

www.tpwd.state.tx.us

attached is a list of rare, threatened, and endangered species that have the potential to occur in Taylor County.

The INRMP also states that a variety of bird species including several neotropical migrants have been observed on Dyess AFB. The Migratory Bird Treaty Act implicitly prohibits intentional and unintentional take of migratory birds, including their nests and eggs, except where permitted. Measures should be taken to ensure that migratory bird species within and near the project area are not adversely impacted by clearing and construction activities. TPWD recommends contacting the U.S. Fish and Wildlife's Migratory Bird Office at (505) 248-7882 should any birds occupy the habitat within the project area.

I appreciate the opportunity to provide preliminary information on this project, and would appreciate receiving the Environmental Assessment for review and comment. Please call me at (512) 389-4579 if we may be of further assistance.

Sincerely,

Julie C. Wicker

Julie C. Wicker
Wildlife Habitat Assessment Program
Wildlife Division

Attachments

JCW:hb.11826

TEXAS PARKS & WILDLIFE

Life's better outside.®

February 16, 2011

Mr. David E. Laurence
7 CES/CEAN
710 Third Street
Dyess AFB, TX 79607

RE: Proposed Waste to Energy (WTE) Plant at Dyess Air Force Base (AFB), Taylor County

Dear Mr. Laurence:

Texas Parks and Wildlife Department (TPWD) received the notice that an Environmental Assessment (EA) is being prepared to analyze the impacts of the above-referenced project. TPWD staff has reviewed the information provided and offers the following comments and recommendations concerning this project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency on or after September 1, 2009 may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number 15658 in any return correspondence regarding this project.

Project Description

The proposed project would entail the construction and operation of a 5.5-megawatt WTE plant on Dyess AFB property. The base plans to purchase power from the successful bidder of a WTE plant solicitation. The plant operator would be responsible for all infrastructure and operational inputs for the plant from public sources. The plant would be segregated from the base and would be sited next to the generator system on Military Drive. The exact design of the plant is unknown at this time.

Previous Coordination

TPWD provided preliminary information on this project or a very similar project in the same location on August 30, 2006. A copy of that correspondence is attached for your reference.

Recommendation: Please review the attached comments and recommendations, as they remain applicable to the project as proposed.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

Methods of Electricity Production

The information provided states that the energy provider would be required by the solicitation to build a WTE plant based on one of the following proven technologies: gasification, pyrolysis, incineration, or plasma. The method of producing electricity is flexible and up to the selected provider, as long as it is one of the four processes analyzed in the EA.

> **Recommendation:** TPWD recommends the EA include an analysis and comparison of the potential impacts of these technologies on wildlife in the area, including any byproducts or disposal requirements.

Cumulative Impacts

As stated above, the proposed project would be sited next to the generator system on Military Drive.

> **Recommendation:** TPWD recommends the EA include an analysis of cumulative impacts from the construction and operation of the WTE plant. This analysis should include impacts that would result from the construction of associated electric transmission lines in to or out of the plant, roadway improvements, and other related activities that could impact fish and wildlife in the area. TPWD also recommends the EA address the cumulative impacts to wildlife habitat in relation to the adjacent generator system.

I appreciate the opportunity to provide preliminary information on this project and would appreciate receiving the EA for review and comment. Please call me at (512) 389-4579 if we may be of further assistance.

Sincerely,

Julie C. Wicker

Julie C. Wicker
Wildlife Habitat Assessment Program
Wildlife Division

JCW:gg.15658

Attachment

Notice of Availability
Draft Waste-To-Energy Plant Environmental Assessment

The United States (U.S.) Air Force (Air Force) has prepared an Environmental Assessment (EA) to assess the environmental impacts of a private entity to construct, own, and operate a Waste-to-Energy (WTE) plant and associated Municipal Solid Waste (MSW) handling facility on land leased from the Air Force at Dyess Air Force Base (AFB). Dyess AFB would solicit bids and then agree to purchase up to 5.5 megawatts (MW) of power from the WTE plant. Four alternative technologies are being considered for the proposed WTE plant. This WTE plant would significantly contribute to fulfilling renewable energy and security goals as directed by the Department of Defense (DoD). This EA has been prepared in accordance with the National Environmental Policy Act.

A copy of the Draft EA and Draft Finding of No Significant Impact are available for review at the following library beginning May 19, 2011.

Abilene Public Library
202 Cedar St.
Abilene TX 79601

You may request a copy of the document from the Dyess AFB Public Affairs Office by calling (325) 696-2863 or by writing to the address below. An electronic version of the EA is available for public review under Quick Links (bottom right of homepage) at www.dyess.af.mil. Please provide any comments on the Draft EA by June 18, 2011.

Please submit comments to:
7 CES/CEAN (NEPA Program Manager)
710 3rd Street
Dyess AFB TX 79607

For additional information, contact:
7 BW Public Affairs
325-696-2863

APPENDIX B

AIR QUALITY ANALYSIS

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Dyess AFB Construction Air Emission Calculations for WTE Plant - Construction within One Calendar Year

Site prep (grading, drainage, utilities etc.) 5.6 acres

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	1	6	7	90	0.59	0.99	3.49	6.9	0.93	0.722	4.67	16.47	32.57	4.39	3.41
Skid steer loader	2	4	27	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.81	17.28	40.90	6.79	3.46
Backhoe/loader	2	6	27	98	0.21	0.99	3.49	6.9	0.85	0.722	14.49	51.08	100.98	12.44	10.57
Small generator	1	4	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.53	2.88	3.66	0.65	0.31
Dump truck	20	1	27	275	0.21	0.68	2.7	8.38	0.89	0.402	46.54	184.80	573.58	60.92	27.52
										Subtotal	70.05	272.52	751.69	85.19	45.26

Foundations (slabs) 115000 sq ft

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	4	50	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	7.08	32.15	76.08	12.64	6.43
Concrete truck	13	2	50	250	0.21	0.68	2.7	8.38	0.89	0.402	102.32	406.26	1260.91	133.91	60.49
Dump truck	15	1	15	275	0.21	0.68	2.7	8.38	0.89	0.402	19.48	77.35	240.06	25.50	11.52
Delivery truck	6	6	31	180	0.21	0.68	2.7	8.38	0.89	0.402	63.24	251.11	779.36	82.77	37.39
Backhoe/loader	2	8	60	98	0.21	0.99	3.49	6.9	0.85	0.722	43.12	152.01	300.54	37.02	31.45
Small generator	2	2	60	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02
										Subtotal	236.98	928.22	2668.84	293.96	148.28

Structures (two 2-story, one 1-story)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.46	2.50	3.17	0.56	0.27
Delivery truck	1	2	24	180	0.21	0.68	2.7	8.38	0.89	0.402	2.72	10.80	33.52	3.56	1.61
Skid steer loader	2	4	50	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	7.08	32.15	76.08	12.64	6.43
Crane	1	8	12	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.70	9.47	61.73	10.16	3.06
										Subtotal	13.96	54.91	174.51	26.92	11.36

Asphalted areas 13,939 SY

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	1	4	6	150	0.59	0.68	2.7	8.38	0.93	0.402	3.18	12.64	39.24	4.35	1.88
Roller	1	4	6	30	0.59	1.8	5	6.9	1	0.8	1.69	4.68	6.46	0.94	0.75
Paver	1	8	6	107	0.59	0.68	2.7	8.38	0.93	0.402	4.54	18.04	55.98	6.21	2.69
Dump truck	16	1	16	275	0.21	0.68	2.7	8.38	0.89	0.402	22.16	88.00	273.13	29.01	13.10
Concrete truck	4	2	18	250	0.21	0.68	2.7	8.38	0.89	0.402	11.33	45.00	139.67	14.83	6.70
Delivery truck	1	2	9	180	0.21	0.68	2.7	8.38	0.89	0.402	1.02	4.05	12.57	1.34	0.60
										Subtotal	43.93	172.42	527.06	56.68	25.72

Volume of hot mix asphalt 62,739 ft^3
Average density of HMA 145 lb/ft^3
CARB EF for HMA 0.04 lb/ton
VOC emissions from HMA paving 182 lb

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	**PM_{10}** Total	**$PM_{2.5}/PM_{10}$** Ratio	**$PM_{2.5}$** Total
0.42	5.6	90	7.1	0.1	0.71

Trenching 6000 LF

Equipment	*No.*	*hours/day*	*days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Backhoe/loader	2	8	12	98	0.21	0.99	3.49	6.9	0.85	0.722	8.62	30.40	60.11	7.40	6.29
Boring Equipment	1	8	2	60	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.25	1.15	2.73	0.45	0.23
Excavator	1	8	3	90	0.21	0.99	3.49	6.9	0.85	0.722	0.99	3.49	6.90	0.85	0.72
Dump truck	4	1	6	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	2	2	5	180	0.21	0.68	2.7	8.38	0.89	0.402	1.13	4.50	13.97	1.48	0.67
Small generator	5	8	13	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.76	20.27	25.78	4.58	2.21
Trencher	1	6	12	100	0.21	0.99	3.49	6.9	0.85	0.722	3.30	11.63	23.00	2.83	2.41
										Subtotal	20.14	79.70	158.09	20.33	13.75

	VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
TOTAL IN POUNDS	567	1508	4280	483	14356	1656
TOTAL IN TONS/YR	0.28	0.75	2.14	0.24	7.18	0.83

References

EPA Report No. NR-005c, *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, April 2004*
EPA Report No. NR-009c, *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* , April 2004
EPA 460/3-91-02, *Nonroad Engine and Vehicle Emission Study--Report* , November 1991
EPA Report No. NR-010d, *Exhaust Emission Factors for Nonroad Engine Modeling—Spark-Ignition* , April 2004.
Midwest Research Institute (MRI). *Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust* . MRI Project No. 110397. October 2005.
Western Regional Air Partnership (WRAP). *WRAP Fugitive Dust Handbook* . September 2006.

Greenhouse Gas Emissions from WTE Operation

Assume: 65000 short tons of municipal waste used as fuel per year
45500 70% is combusted and 30% is recycled

Emissions from waste hauling:

Assume 8 tons capacity per truck
8125 trips total
From Table C -1, Subpart C of 40 CFR 98 : 73.96 kg CO2/mm Btu
0.138 mmBtu/gal

From Table C-2, Subpart C of 40 CFR 98: 0.003 kg CH4/mmBtu
0.0006 kg N2O/mmBtu

from *Estimation of Fuel Use by Idling Commercial Trucks, Argonne National Laboratory* :
Average fuel economy: 4.4 mpg
Average Idle time: 1 hr/day
Idle fuel flow rate: 1.055 gal/hr

Average distance traveled 20 miles
(Abilene/Dyess/Abilene)
Number of days of operation (5 days/52 weeks) 260 days/yr

CO2: 415.8804 T/yr

CH4: 0.017 T/yr

N2O: 0.003 T/yr

Total CO2e : 379 metric tons/yr

# trips	RT mi	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
8,125	20	0.000864	0.00386	0.0151414	1.81E-05	0.000427	140.4353	627.301	2460.482	2.937675	69.3875
						Tons/yr	0.07	0.31	1.23	0.00	0.03

Emissions from waste combustion:

From Table C -1, Subpart C of 40 CFR 98 : 90.7 kg CO2/mmBTU

Methodology for Allocating Municipal Solid Waste
to Biogenic and Non-Biogenic Energy, EIA: 11.73 million Btu/short ton

Assume 30% of MSW is recycled (reference: http://www.energyrecoverycouncil.org/waste-energy-reduces-greenhouse-gas-emissions-a2966

From Table C-2, Subpart C of 40 CFR 98: 0.032 kg CH4/mmBtu
0.0042 kg N2O/mmBtu

CO2: 53360.6 T/yr

CH4: 18.8 T/yr

N2O: 2.5 T/yr

Total CO2e : 49496 metric tons/yr

Total CO2e from hauling and combustion: 49874 metric tons/yr

APPENDIX C

TCEQ WASTE DETERMINATION LETTER

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 9, 2007

Mr. Kyle Shelton
JDC Consulting, L.P.
404 Camp Craft Road
Austin, TX 78746

Re: Request for Confirmation of Generator Classification.
Dyess Air Force Base (Dyess)
Hazardous Waste Permit No. 50250
Industrial Solid Waste Registration No. 64003
EPA Identification No. TXD3571924643
WWC12024065-2; RN104418074 / CN602717894

Dear Mr. Shelton:

The Texas Commission on Environmental Quality (TCEQ) has reviewed your letter dated December 5, 2006, requesting that the agency reconsider its conclusion that construction and operation of the Waste to Energy (WTE) plant on Dyess's property will result in reclassification of the Dyess facility as an "Industrial" Large Quantity Generator.

According to the information in your letters dated October 11, 2006 and December 5, 2006, respectively:

- The WTE project is being designed to generate electricity by gasification of municipal solid waste;
- The WTE plant would produce electricity exclusively for on-site use at Dyess facility to meet their internal electricity demands and will be augmented with back-up diesel generators for use during black/brown outs, emergency situations/force protection and to reduce peak loads;
- All the electricity generated by the plant will be consumed on-site at the Dyess facility and the electricity will not be produced for sale or distribution as a "commodity product";
- Dyess is currently registered as a Non-industrial Large Quantity Generator; and
- Current base operations do not consist of any manufacturing activities or operations identified in Appendix G of TCEQ Form 00002 – Instructions for Completing the Notification for Hazardous or Industrial Waste Management.

Based on the information provided in your letters referenced above the construction and operation of the WTE plant will not result in reclassification of Dyess as an "Industrial" Large Quantity Generator.

Please contact Ms. Vaishali Tendolkar of the Industrial & Hazardous Waste Permits Section at 512/239-5747 if you have any questions. If responding by letter, please include mail code MC 130 in the mailing address.

Sincerely,

Enoch Johnbull, P.G., Team Leader
Industrial and Hazardous Waste Permits Section
Waste Permits Division
Texas Commission on Environmental Quality

ETJ/VT/ff